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THE BACKGROUND TO HARVEY*

BY

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The personality of every great man has a certain impact on his own generation, but when Thomas Hobbes said that Harvey was the only man who had seen his theories accepted during his lifetime he must have been thinking of the younger generation which had grown up since the theory became known. For the men of Harvey's own standing were never convinced. Questions that we know were put to an unsuccessful candidate for the Licentiateship in 1632 prove that his discovery had not yet been accepted by his colleagues. Nevertheless, had his biography been written in the vogue still only too prevalent of searching for what was called "the real man," which means a hunt for his failings, Harvey would have emerged from the ordeal very well, and it would still have to be allowed that he profoundly influenced physiology, if not medicine, for the rest of the century. Mr. Wilfred Trotter said of John Hunter: "It needs all our imaginative sympathy to picture the twilit country in which his labours were carried on—the air is dim and thick, the range of vision short, the appearance of things ambiguous. . . ." This is even truer of Harvey, but as Mr. Trotter pointed out, Hunter's influence was more limited to the indirect and germinal, while every student of physiology is in some sense the beneficiary and direct legatee of Harvey.

I do not aspire to paint yet another portrait of Harvey, for the hastiest perusal of the Orations will prove how well that has been done, but to try to picture something of his background, in the hope that thereby I may do something to make his figure stand out more clearly against it: not so much the physical background of Cambridge, Padua, St. Bartholomew's, and this College as the background of the thought of his time. An ambitious task, but it has always interested me to inquire why men thought what they did when they did. And this shall be my offering to a great name. I am the more encouraged to make this attempt because, for reasons I hope to analyse, the seventeenth century has a topical interest for us to-day. Different ages have been interested in different epochs: our fathers were interested in the Renaissance; the Renaissance was interested in the Classical Age; to-day we seem to be rounding off a school of thought that was born in the seventeenth century, and so we turn back to inquire, Why did men think what they did then?

We are learning that the Dark Ages were not so dark as they were painted. The marvellously rapid flowering of the Renaissance tends to blind us to the subtle changes that were occurring before. Sometimes there comes a spring so early in the year that we fear the return of a frost that will nip the incautious buds. Something of that sort happened in Europe in the thirteenth century. There was a stir in the air. True, there had already been a revival of architecture, but now a new and delicate art was being revealed by such men as Duccio and Giotto. A new attitude to the world, a frank love of nature, of life in all its manifestations made its appearance. I like to think it was due to St. Francis of Assisi. His example certainly inspired Giotto to his earliest creative efforts, and the Franciscans were the first scientific investigators of this new age. For when man begins to wonder he desires to investigate. Was not Roger Bacon, the father of English natural science, a Franciscan?

And then came the frost, and the icy fetters of theological authority imposed a return of winter. Roger Bacon languished in prison for many years, and no attempt was made to revive any interest in experiment until the days of his greater namesake. The impulse towards a newer, freer attitude to life was nipped in the bud, and had to throw down deeper roots before again emerging. One great and permanent gift remained—the universities.

The Renaissance was late in reaching England. Even in France it was unknown till 1494, and the first Renaissance architecture in England is to be found in a chantry dating from 1500 in Christchurch Minster. Consequently we are in this country a little apt to overstress the part played by the new learning, the new writing, and the new world in producing that wonderful efflorescence. Its inner essence remains as mysterious as the springing of youth into adolescence, and these events had found a soil already fertilized as the work of Donatello, Fra Angelico, and Luca della Robbia testified. It has been said, somewhat sardonically, that at Cambridge "learning like a stranger came from afar" in the person of Erasmus in 1510. Eight years after that Thomas Linacre founded this College, and two years later his lectureships at Oxford and Cambridge, while in 1540 Henry VIII founded the regius professorships there. With such a splendid start it may seem strange that the immediate results were disappointing. Yet on inquiry it is not so surprising. For the aim was to revive the old medical learning. It was authoritarian. Medical teaching at the universities consisted in the reading and expounding of Hippocrates and Galen, and in this College, in 1559, John Geynes was cited for impugning the infallibility of Galen. Not until he had humbly recanted was he admitted to Fellowship in the following year. Something more was needed than the revival of the old; a new spirit was required to make these dry bones live. It seems paradoxical that the reign of Mary Tudor should have indirectly contributed to this desirable end, but those who fled then to Geneva, Frankfort, and Strasbourg returned on Elizabeth's accession, bringing with them a wider culture than England had previously known. But that

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new spirit found clearest expression in Francis Bacon's *Novum Organum*. In these days, when every week some book is proclaimed as epoch-making, it sounds jejune to apply this epithet to a work which showed the way to the investigation of the world of phenomena. Projected in his youth, it was prepared by a series of sketches, revised and rewritten at least twelve times, and finally published in 1620.

Influence of Bacon's Philosophy on Contemporary Thought

Men did not realize its portent at once. Even Harvey was mildly scoffing at his distinguished patient's philosophy though he admired the man. Yet as Sir William Hale-White clearly showed in his Oration, he must have been deeply influenced by it. Just so, though more openly, men scoffed at Darwin, Lister, and Freud, only to find themselves, a few years later, utilizing their ideas and their methods. Why does this history repeat itself so inevitably? Because "there can be no approach to truth without some threat to the thinker's personality" (Trotter). The dogmatic rationalism of the scholastics had produced a system which claimed to give a coherent and consistent account of nature, of man, of the spiritual world, and of any other kind of world which might be supposed to exist. Why trouble to look further, why explore an uncharted sea? The unknown might change us, shake us out of our comforting certainties. Without curiosity there can be no science.

Into this dusty atmosphere of scholasticism Francis Bacon came like a breath of fresh air, declaring that we are not spiders to go on indefinitely spinning cobwebs out of ourselves. He praised the more excellent way of the bee, which gathers its material from the flowers of the garden and of the field, but digests it and transforms it by a power of its own. Though much of it appeared in his earlier works, the *Novum Organum* contains the fruit of his thought.

Bacon never claimed to have originated the method of induction, which he freely attributed to Plato. But so great a stimulus did he give to its employment that it may seem strange that his plan for the renewal of the sciences has never been deliberately followed in its entirety by others. Two, perhaps three, flaws in it may offer a partial explanation. In the first place the defects in his own scientific equipment led to a certain crudity in his conceptions of nature, which gives some justification for Harvey's scoff that Bacon "wrote philosophy like a Lord Chancellor." In the second place he claimed that his way of discovering sciences went far to level man's wits and left little to individual excellence. Never was there a greater fallacy. It leaves out of consideration the scientific use of the imagination. Fabricius had observed the valves in the veins, but regarded them as pockets designed to catch blood that would otherwise have collected in the extremities. Robert Boyle tells us that Harvey saw a tiny but momentous flaw in the argument; for he observed that the veins to the head also had their valves set towards the heart. There was the germ which, cultivated by his scientific imagination, flowered into his immortal discovery. Pasteur said that chance only visits the mind that is prepared. Although Darwin claimed to have worked on true Baconian principles, he wrought better than his master knew, for his collection of instances was guided by a hypothesis of which the validity could be tested. No one who has had to disburse the endowments for research can accept the view that the scientific method levels men's wits.

In the third place, when Bacon said "I only sound the clarion, but I enter not into the battle," he deprived himself of the crucial test of his own method. He did, as a matter of fact, carry out a few experiments, one of which was fatal, for on a wintry day in March, 1626, he caught the chill which ended his life while stuffing a fowl with snow to see if cold would delay putrefaction. It was probably this scant practical experience which led him to slight William Gilbert's work, a more careful study of which would have saved him from some errors. Gilbert was "the first real physicist and the first trustworthy methodical experimenter," and we are proud that he, who influenced Harvey, was a President of our College.

Nevertheless Bacon "did more than anyone else to free the intellect from preconceived notions." In his own words, he pointed the way to "a new and unexplored kingdom of knowledge within the reach and grasp of man, if he will be humble enough and patient enough to occupy it."

But he was notoriously a better guide in science than in morals, and it is impossible to understand seventeenth century thought without taking into account its preoccupation with morals. At the Renaissance men felt released from the moral and religious codes which had bound them for centuries; they believed that they could reap where they had not sown. The subtle awakened intellects appreciated the advantage of brain over brawn, and proceeded to exploit the simpler-minded. Caius even came to doubt the wisdom of his benefactions and of his support to the new learning. However, the reign of the Machiavellis was not unchallenged for long. Morality would keep breaking through. Over this line of cleavage Shakespeare brooded. A new sensibility was being born, and he was conscious of a note of irresolution. He realized that the Mercutio of the South was giving way to the Hamlet of the North. Unlike Dante, who was always a judge, Shakespeare was a recorder. It takes a poet to plumb a poet's mind, and it was John Keats who put his finger on one of Shakespeare's greatest characteristics, his capacity for "being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason."

The age had been one of feverish activity. England had experienced every stimulant: wild adventures in the ends of the earth, threats of destruction from abroad, constant plots within. Now it was beginning to sober down. Though Shakespeare could remain with his mind in suspense, his fellows could not. They wanted facts. Again the cry arose, "What is truth?"; but this time the jesting Pilates stayed for an answer. "The climate of opinion" is a happy phrase we owe to Joseph Glanvill (of *Scholar Gypsy* fame). How did men comport themselves in the new climate that was surrounding them? According to their kind; some simply looked back with bitter regret, others forward with eager anticipation, some imitated Mr. Facing-both-ways.

Robert Burton looked back. He was a scholiast born out of due season, and grew old in an age he condemned. Like the "melancholy Jaques" in many ways, he had a melancholy of his own, compounded of many simples, indeed, for his *Anatomy of Melancholy* is a mosaic of quotations. Mark Pattison described the typical scholastic attitude thus: "If a great writer has said a thing, it is so." It reminds one of case-made law, always so foreign to the medical mind. But the authoritarian note was no longer acceptable in the new atmosphere, and Burton felt that by any human standard the entire order of the universe was irrational. It has been said that he was filled with hatred, scorn, and derision for the whole scheme of things in which he found himself. What could one do, he protested with tears in his eyes, but laugh? Touchstone and Jaques in one.

John Donne's Modernity

John Donne, the famous Dean of St. Paul's, on the other hand, illustrates alike in his life and thought the transition from the sixteenth to the seventeenth century.

He was "in certain aspects of mind and training the most mediaeval, in temper the most modern of his contemporaries." As Mr. John Sparrow wrote with deep insight while still only a schoolboy at Winchester:

"Despite all vicissitudes of fortune, despite even the apparent changes in his character, Donne himself was always essentially the same. . . . There are two ways of arriving at the pitch of emotion necessary for the production of such writings as Donne's. One is the absolute surrender to pleasure, and the sacrifice of the ordinary standard of morals; the other is the complete banishment of pleasure, and the consistent living up to an ideal. Donne adopted both of these. . . ." And "there lingers about him something unexorcised as if pagan incense were burning in a Christian crypt."

Brought up a Roman Catholic, he had become Anglican by the time he was 24, but his steps to the altar were somewhat devious and faltering. He was worldly and time-serving, ascetic and devout, with equal sincerity. He stood haughtily apart from his contemporaries except Ben Jonson, for he had the scornful indifference of the innovator, regarding himself as destined to inaugurate a new era. He revolted against the conventional and classical imagery of the Renaissance, and was as determined to break it up as Wordsworth was to release poetry from Miltonic diction when it had become outworn through sedulous imitation. He experimented with prosody and rhythm like our own Laureate Fellow, Robert Bridges. It is significant that there has been of late a great revival of interest in Donne, just as there has been in El Greco. The writings of one have affinity with the paintings of the other. Both can be ascetic and devotional, just as they can be distorted, startling, and bizarre.

This reawakened interest is comprehensible if I am correct in my thesis that certain trends of the seventeenth century are reasserting themselves to-day. "Every young poet to-day would like to write like Donne; intensity is the most admired of all qualities. Yet—and there's the rub—so few know what to be intense about, except negative attitudes" (Desmond MacCarthy). Certain it is that modern poets have abandoned the mellifluous line of Tennyson for a condensed allusiveness, an obscurity, a concentration of thought, an imagery drawn from things of everyday life just as Donne departed from Marlowe's mighty line to the same end. Whether beauty has been served thereby must be left to individual opinion. The modernity of Donne's ideas in some ways is shown by the fact that he wrote an essay in favour of voluntary euthanasia in 1624. The essence of his intimate thought is to be sought, however, in his *Devotions on Emergent Occasions*, written during a serious illness. Did any writer ever relish an illness so keenly? It certainly gave opportunity for his self-flagellating temperament, and it is entertaining to observe how gratified he was when the King sent his own physician to consult upon his case.

A greater and more sympathetic figure than either Burton or Donne was Sir Thomas Browne (1605-82). Like a two-headed Janus he looked both backwards and forwards. To this peculiarity of his temperament one of the fascinations of his style is due, for it will be observed how frequently a classical phrase or allusion is balanced against an Anglo-Saxon word or homely illustration. Moreover, this dualism of phraseology is accompanied by a dualism of thought, which he clearly acknowledged when he said: "Thus is Man that great and true Amphibium, whose Nature is dispos'd to live, not only like other creatures in diverse Elements, but in divided and distinguished worlds."

To this point of view modern philosophy is tending. The materialistic science of the nineteenth century is dead, neo-vitalism died with the recent lamented passing of its greatest exponent, and, while the mechanistic theory of life is being pushed further than ever, its protagonists gladly admit that at most it can only attain one aspect of the truth. Thus Sir Thomas Browne joins hands with the twentieth century, though the way in which he expresses this attitude of his mind may give one the impression of scepticism hand in hand with credulity. As he said, "Where Truth seems double-faced, there is no man more paradoxical than myself," for he had realized that where a fact or opinion previously widely adopted can be tested by experiment, and is not proved correct thereby, you should give it up. But where it is not open to experiment, or that method has as yet been insufficiently applied, you are at liberty not to give it up and to doubt the wisdom of those who do. Unlike Bacon, who rejected hypotheses, he attempted to use them. The particular fact was important in Bacon's eyes, the general principle in Browne's.

Sir Thomas Browne was an Honorary Fellow of this College, but it is not correct to say, as it often is, that he became a Fellow of the Royal Society. The name "T. Browne" modestly squeezed into a corner of their Roll is that of his beloved grandson, to whom he wrote such charming letters. It has been stated on Wilkin's authority that Sir Thomas wrote the Harveian Oration for his son Edward to deliver. The *Sloane Manuscripts* contain this Oration in Sir Thomas's writing with references to the lecture theatres in different Continental universities which Edward had visited, for on this subject, as his father pointed out, he could tell "more than any other is like to say." But as a matter of fact Edward was never Harveian Orator. Perhaps with fatherly pride he had expected him to be, and it is unfortunate that he did not live long enough to see his son occupy our Presidential Chair, which would have more than compensated for any earlier disappointment.

It was Sir Thomas Browne who enriched our language with the word electricity. That he was himself an experimentalist can be seen from his *Miscellaneous Writings*. Mr. Geoffrey Keynes says that he "may be justly compared with his contemporary Robert Boyle in his restless curiosity and his use of the experimental method, though he fell far short of Boyle in his achievement." Dr. Needham, however, attaches great value to his work on the chemical aspects of embryology, which has been quite overlooked, although his originality and genius in this field is hardly less remarkable than in so many others. Harvey's approach to embryology, unlike Sir Thomas Browne's, was in the main morphological, and to-day the biochemical aspect of that subject has pride of place.

On such an occasion as this, when we are striving to find "an antidote against the opium of time," Browne's *Urne-Buriall* may strike us with a sudden chill: "The iniquity of oblivion blindly scattereth her poppy, and deals with the memory of man without distinction to merit of perpetuity. . . . Diuturnity is a dream and folly of expectation." Yet it is not entirely true, for were it so should we be listening to his solemn music to-day? Saintsbury, no mean judge, speaks of

"a mixture of shaded sunlight and half-illuminated gloom which makes the charm of his style and habit of expression; its connexion with the singular clarity and equity of his temper and judgement is quite unmistakable."

How well this corresponds with the description of the man by his intimate friend Whitefoot: "He was never seen to be transported with mirth or dejected with sadness." He was indeed himself the great "Amphibium," and while he was floating placidly in divided worlds, the great "Leviathan" pushed on stormily towards a completely materialistic philosophy.

Thomas Hobbes's Conception of a Totalitarian State

Thomas Hobbes was born in the year of the Armada and lived through the Civil War, the Commonwealth, and the Restoration to within nine years of the Revolution. Much had he seen and known of changes during those more than ninety years, yet he remained unchanging, obstinately set in his opinions. When the Long Parliament began to be active, he fled to France, where he became tutor to the future Charles II. But in 1657 he returned to England because he feared the attitude of the French clergy, who were no more tolerant towards him than the Puritans. He was a friend of Ben Jonson, of Lord Herbert of Cherbury, whose philosophy was diametrically opposed to his, and of Descartes, and he knew Galileo. Harvey left him a legacy. He was not only a friend of Bacon, but acted for a time as his secretary. Yet he never set much store by experiment, and he founded his mechanical theory on Galileo rather than on Bacon. It is a little disconcerting to find that men of such varied culture left him so unaltered. It is also suggestive of some attractive traits in the man that they put up with his truculence.

His theory was neither attractive nor flattering, starting as it did from a belief that the whole nature of man is a consistent scheme of selfishness. It was not until he was 40 that he formulated his philosophy on a geometrical basis. I like Aubrey's account of this. In a friend's library

"a copy of Euclid lay open at the forty-seventh proposition of the first book. So he reads the proposition. 'By God,' says he, "That's impossible." So he reads the demonstration which referred him back to another (and so on), that at last he was demonstratively convinced of that truth. This made him in love with geometry."

He wanted to reduce the doctrine of justice and policy in general to the "rules and infallibility of reason after the fashion of mathematics." For him motion was the one reality, all others but "the fancies, the offspring of our brains."

From geometry he passed through physiology to moral philosophy, believing that "the motions of the mind have physical causes." There is a suggestion of conditioned reflexes and behaviourism in the statement that "the internal motions set up by the action of objects upon the senses become reactions on the external world and these reactions minister to the preservation of the individual." He maintained that the appetites and passions of men are such that unless they be restrained by some power they will always be making war upon one another. Government is a social compact for the sake of peace, and men must give up their rights to one man or one assembly of men. And thus we arrive at the absolute monarch, who has rights but no duties, as the apex of his pyramid. Curiously modern some of these items, even if the sequence is a little obscure: matter as a form of motion, and conditioned reflexes leading up to the conception of a totalitarian state. And this quotation is painfuly topical: "Covenants of mutual trust where there is a fear of not performance on either part are invalid." These are the main arguments in his chief and most famous book *The Leviathan*. But though an amateur, he could not refrain from controversy with genuine mathematicians and scientists such as John Wallis, the first of Glisson's pupils to proclaim Harvey's discovery in public, and with the great Robert Boyle. In these disputes he was labelled "the greatest of circle-squarers."

There is a logical sequence in his attempt to show that the whole fabric of human life and society is built out of simple elements. It is in his premisses that error lies, for "the individual is neither real nor intelligible apart from his social origin and traditions [which] influence his thoughts and motives" (Sorley). Still, as I have reminded you, certain schools of thought to-day favour this pushing of the mechanistic theory as far as it will go, while recognizing, as Hobbes did not, that it must leave a whole system of values untouched. And for good or evil the totalitarian state is with us to-day. So one cannot help feeling a certain regard for the obstinate old man who stuck to his logic with more than French tenacity, and who was only just spared from seeing the divine right of kings finally perish in this country with the landing of William of Orange.

The Cambridge Platonists

For throughout the century the doctrine of the divine right of kings had been challenged by a people who were finding their staple intellectual and spiritual food in the Authorized Version of the Bible. As Fisher says:

"Here was a people's University. Plunging into this vast miscellany, where all that is most solemn and sublime from the distant East is mingled with the records of a savage antiquity, the peoples of England wandered at their own sweet will, unshepherded and unfettered, and finding always by the way lessons for the conduct of life, some of infinite depth and beauty, but others prompting to gloom, pride, and self-sufficiency."

What the nation needed on waking from the heady dreams of the Renaissance was what Europe needs to-day—a time of political peace and social calm. But it was not to be. Though knowledge continued to grow, the thoughts and emotions of the people were diverted by class hatred, religious controversy, and political storms. The climate of opinion was overcast with thunder clouds, and Milton's "two-handed engine at the door" stood ready to smite. It has been well said that it was King James's Bible that cost his son his head.

I believe that if the Cambridge Platonists could have had their way much strife would have been avoided. In the political and theological turmoil of the times theirs was a steadying and pacifying influence, but unfortunately not sufficiently widespread. Yet Harvey thought little of them. In this matter he was more Royalist than the King. Their home, both spiritual and material, was Emmanuel College. In 1584 Sir Walter Mildmay obtained a charter of incorporation, purchased the home of the Black Friars which had fallen into ruin after the dissolution of the monasteries, and rebuilt it as Emmanuel. Mildmay was a Puritan, and from the first the college had a decidedly puritanical character. He told Queen Elizabeth that he had "set an acorn, which, when it becomes an oak, God alone knows what will be the fruit thereof." That acorn grew fast, and Fuller wrote in 1634: "Sure I am at this day it hath overshadowed all the University, more than a moiety of the present masters of the Colleges being bred therein." Soon after Fuller wrote this the influence of Emmanuel was to spread across the Atlantic, for John Harvard migrated thence to Massachusetts and saved a college there from disaster with his father's money, to make it the pioneer university in the United States.

Mullinger, the erudite, if eccentric, librarian of St. John's College in my undergraduate days, regarded Sherman of Trinity as the founder of the movement, and Henry More, who was certainly a leader, hailed from Christ's. But all the others, of whom I need only mention Whichcote, John Smith, Cudworth, and Culverwel, were all trained at Emmanuel. Their avowed intention was to bring the Church back to "her old loving nurse—the Platonick philosophy." Their Platonism was, in Wordsworth's phrase, "reason in her most exalted mood," and has been expressed more fully as

"the mood of one who has a curious eye for the endless variety of this visible and temporal world, and a fine sense of its beauties, yet is haunted by the presence of an invisible

and eternal world behind or . . . within the temporal and visible" (J. A. Stewart).

But they were not mere mystics; they regarded abstention from dogmatism as one of the most effective means of promoting unity and concord. Whichcote held that the inductive method was as calculated to prove effectual in allaying theological contention as it had been in the hands of Galileo and Harvey in their respective fields. He maintained that authority proceeds from right reason, not reason from authority. And further he said, "it ill becomes us to make our intellectual faculties 'Gibeonites,' hewers of wood and drawers of water for the will and the emotions." No wonder that most of them detested Hobbes's materialistic philosophy and were alarmed at his influence. Though he was intellectually more than a match for them, they had a vision which he lacked.

Though Puritan in origin, it would be a mistake to regard them as simply Puritans; theirs was a middle course. They had that wider culture which is sometimes successfully grafted on a Puritan stock. Dean Inge, in his book on the Platonic tradition, says:

"Besides the combative Catholic and Protestant elements in the churches, there had always been this [third] element with very honourable traditions, which came to life again at the Renaissance but really reaches much further back. The flame which [the Cambridge Platonists] kindled among us was lighted in Italy, when Grocyn and Linacre visited the famous Platonic Academy at Florence." But they received "the treatment, as we know both from history and fiction, which those must expect who interpose their persons between two violent combatants. . . . In time of war the prophet and seer are not wanted. Effective partisan cries have to be devised which will appeal to and be understood by the masses. All fine issues are coarsened."

One must regretfully feel that, just as the story of the Reformation would have been very different if Erasmus instead of Luther had been its leader, so would the history of Charles I's reign if Roundhead and Cavalier could have listened to the sweet reasonableness of these Platonists. But the scholar is no match for the demagogue at such times.

Yet their labour was not in vain in the intellectual world. Only six months after Henry More entered, Milton left Christ's. We know that he described his academic studies as "an asinine feast of sow thistles and brambles," yet a few years later "Cambridge men were deep in Descartes and some of them in Bacon." A new intellectual life sprang into being, and the leaven spread as the Platonists were appointed to responsible positions throughout the university. I cannot enter the courts of Emmanuel without feeling that something of the cool restraining influence of those Platonists haunts them still. They should be living at this hour. Peace be to their ashes.

Seventeenth Century Belief in the Supernatural

We are apt to forget that all the Athenians were not reasonable enlightened people, clearly though their refusal to learn from experience proclaims the fact. In the same way we sometimes forget that the enlightenment of the Renaissance never penetrated the popular mind, which remained largely mediaeval in outlook. Just so to-day we can see what the ordinary man feels and thinks from the letters he is impelled to write to the popular press rather than from the writings of Whitehead and Inge. The great witch controversy of the seventeenth century throws light on the popular mentality, in which, alas, greater minds shared. To us it seems almost incredible that such men as Sir Thomas Browne, Henry More, and Joseph Glanvill should have believed in witches. But we must remember they felt that to doubt the existence of evil spirits implied an equal doubt in the existence of beneficent spiritual forces. In appealing to demonology they were

"tapping a reservoir of traditional supernatural belief which lay deeper in the national consciousness than Christianity itself, and deeper certainly than the new ice-crust of rationalism which now covered it" (Willey).

H. V. Routh explains this obsession in terms of modern psychology by saying:

"As men struggled towards a higher level of civilization, they instinctively accused these pariahs [witches, etc.] of all that . . . progress had branded as accursed, but could not eradicate from the imagination. . . . For many, and in some cases, subconscious motives, men wished to believe in witchcraft—and the intellect generally follows the emotions."

It was the peaceful penetration of the scientific outlook which ultimately destroyed the belief in witchcraft.

In this matter Harvey was on the side of the angels. We know that he presided over the committee which examined the survivors of the unfortunate Lancashire Witches in 1634 and pronounced them free from any of the signs then supposed to indicate a witch. Then there is the amusing story of his being sent by the King to inquire about a witch on Newmarket Heath. Harvey pretended to be a wizard and got her to show him her familiar—a pet toad. In her absence he dissected it and found it to be an ordinary toad. He pacified the old woman, exasperated by the loss of her pet, by explaining he was the King's physician and had adopted this method of clearing her reputation. One can vividly picture the scene; indeed, if Harvey were the "cholerick little man" as pictured by Aubrey, it is all the more to his credit that he handled the infuriated beldame so gently. Nor does his courtesy in controversy, so rare in those days, support Aubrey's epithet. We may attribute some share in this tolerant attitude of his to the united family that formed the background of his early life. Indeed throughout they obeyed the request in their father's will to live in unity and mutual help, and one hears an echo of this in Harvey's injunction to our College.

The background furnished by Caius College, St. Bartholomew's Hospital, and our own College has been fully described by others and needs no comment from me save this: we like to think of them in terms of our personal knowledge; but they have all changed, almost beyond recognition, and changed immensely for the better. But until the war Padua still looked much as it must have done when Harvey paced its colonnaded streets and secluded Botanic Garden. He must have gazed on Giotto's simple dignified frescoes in the Chapel of the Arena, and marvelled as we do still at the mingled beauty and learning so enthusiastically expressed by the youthful Mantegna on the pictured walls of the Eremitani. The vast Salone still shelters Donatello's wooden horse, and his sculptured high altar reposes under the five domes of San Antonio. In the buildings of the University, nicknamed "Il Bo," stands the anatomical theatre where Harvey watched the dissections of Fabricius—that theatre which served as the model for the old anatomical theatre at Cambridge that lasted into my own student days. Just as the spirit of his maturer age is preserved in this College, so in Padua we can best realize the material surroundings of Harvey's youth. Here, too, we may well imagine he gained that knowledge of art which fitted him to be entrusted with the responsibility of buying pictures in Venice for such a connoisseur as Charles I.

Harvey's Studies in Embryology

Soon after that historic cannon ball on Edgehill roused Harvey from his book he retired to Oxford and the pursuit of embryology. He had previously gathered much practical lore from the keepers of the royal forests, and a countryman said of him "if he had been as stiff as some

of our starched and formall doctors he had known no more than they." It must have been a relief to leave the turmoil behind and to watch the development of the chick in Bathurst's rooms in Trinity. This aspect of his work has quite naturally received less attention in these Orations, except for Dr. Herbert Spencer's scholarly exposition fifteen years ago. Since then embryology has advanced in a new direction which makes it fitting to return to the subject for a few moments.

The widest differences of opinion have been expressed concerning his *De Generatione Animalium*. Sir George Ent felt like "another Jason, enriched with the Golden Fleece" when he was allowed to carry it off for publication. Some others have regarded it as a splendid failure. The recent critical analyses of its contents by Needham and by Meyer will help to restore the balance between those two extremes. One cannot help feeling that loyalty to a great name has inspired praise lavished by some, and that the work contains much speculation as well as observation.

I said at the outset that the personality of every great man has a certain impact on his own generation. The converse is inescapably true. We may rightly marvel more at the release from contemporary thought which Harvey displayed in his work on the circulation than at his bondage to it as shown in his embryology. The results of the different mental attitudes that characterize the two books may be summed up in Bacon's aphorism: "If a man will begin with certainties he shall end in doubts, but if he will be content to begin with doubts he shall end in certainties." When at the end Harvey said he despaired of understanding development, we may fairly ask whether he did not begin with what he regarded as some certainties.

Yet much of value remains. Harvey stoutly upheld the doctrine of epigenesis against the prevalent theory of preformation. It is astonishing what a hold that Chinese box idea of the ovum continued to have even into the early nineteenth century. Harvey's conception of the gradual differentiation of the simple and homogeneous into the complex and heterogeneous showed philosophical insight, and anticipated the ideas of the present century. Nor was this all. He anticipated Glisson by a quarter of a century in the generalization that all living tissues are characterized by a response to stimulation, and he contested the view of his own master Fabricius that the maternal and foetal circulation directly communicate. And to him we owe the epigrammatic generalization "ex ovo omnia."

Considering how little Cambridge did for Harvey in his lifetime, I feel in private duty bound to emphasize something of what my University has done in the last sixty years to develop some of his views. Harvey's idea of the intrinsic rhythm of heart muscle was carried to triumphant demonstration by Gaskell and has formed the basis of the new cardiology. Frank Balfour's evolutionary conceptions of embryology may be out of fashion now, but what a stimulus they gave to the whole of animal morphology. And they were based on epigenesis. Balfour had been dead seven years when I went to Cambridge, but his old department was still lit with the radiance of his enthusiasm. The studies of Walter Heape and of our own Baly medallist, F. H. A. Marshall, have carried on the torch. And the latest phase, the new chemical aspect of embryology, is associated with the name of Joseph Needham, our Oliver-Sharpey Lecturer of this year.

The Modern Parallel of Harvey's Time

I have tried throughout to indicate the ways in which the turmoil of thought in Harvey's time is reproducing itself to-day. In both instances there had been a phase of great and rapid expansion both in thought and in wealth, followed by disillusionment on the intellectual side and greater stringency on the financial. On each occasion old standards were destroyed before adequate new ones could be provided in their place. A new phase of thought is accompanied by a new form of art. If the Baroque did not spring from the Counter-Reformation it was at least greatly fostered by it. The exponents of the new Baroque, Picasso and Epstein, appear to express the feelings of the post-war generation more satisfactorily than they do mine. In their influence on younger poets Donne is paralleled by T. S. Eliot. It is not without significance that some modern writers are beginning to justify Machiavelli and his ideal of the domination of a ruthless leader, while Elizabethan and Jacobean thinkers felt the effect of his doctrines to be corrosive and withering. It has been well said that:

> "the sinking of the clear exaltation of Elizabethan dramatic poetry into the sophisticated, satirical conflicting mood . . . of the Jacobean drama had many concurrent causes. The apprehension, regret, and disillusionment inevitable to the conscious passing of a long period of high civilization were not in this case unfounded, and those who had known the great age, even those who had only grown to manhood during its latest year, were touched by them (like the generation that succeeded the Great War) without being able to define their loss in what had passed. Moreover . . . a stage of development in which some transition from wonder and discovery to assessment and criticism was inevitable."

The modern parallel unfortunately needs no emphasizing. There is, however, one outstanding difference. Then the way of investigation by experiment was new and seemed full of hope; now there are murmurs to be heard against science itself. Bacon's utterances have not quite the same thrill. The discovery of facts has not in the long run proved so exhilarating after all (Basil Willey). Science, on the one hand, offers material comfort, on the other, intellectual abstractions. This leads to a mechanized world without moral direction. Too many men use dangerous machines like toys, as would a child. In the reaction against this we are actually hearing sighs of regret for the passing of the scholiasts, with their strange doctrines that a belief can be metaphysically true though empirically false. Men grasp at the indeterminacy of the atom to revive the idea of miracles. As in other ages of spiritual doubt and political uncertainty, the cult of astrology, not to mention other strange cults, is becoming fashionable.

Man's brain has not been able to adapt itself quickly enough to the material changes of the last hundred years. Sir Alfred Ewing was saddened in his last years by the use men were making of the inventions he himself had helped to promote. Lowes Dickinson asked if there were a way of escape from the alternatives: Shall we allow science to destroy us, or shall we destroy it to save ourselves? Such statements, however, relate to the physical sciences: biology must restore the balance. If we would understand ourselves—a much-needed investigation—we must realize that we are subject to the laws of biology. A study of history from the biological angle would contribute towards that understanding.

And of all branches of biology medicine can play the largest part in the reconciliation of science with ethics. In these latter days medicine is becoming increasingly psychological in its approach to suffering, while developing its scientific armament as much as possible. The field of medicine is ever widening; we can neither remain isolated in our laboratories nor merely stay by the bedside. We are taking a broader view of Harvey's injunction to seek out the secrets of nature, and are becoming one of the leading social services. In that development I am proud to think that his ancient College is now playing an increasingly important part.

Towards the end of his life Harvey wrote to a young medical man that as an explorer his own days were, alas, numbered. "But," said he, "it will always be a pleasant sight to see distinguished men like yourself engaged in this honourable arena." There spoke the true spirit of adventure, glad to hand on the torch to the younger generation. In like spirit it is good for us on this morrow of St. Luke's to pause amid the rush of life for an hour to join hands with those who have gone before and with those who will come after us. Thus is the real continuity of this College assured. And so I exhort you in Harvey's own words "for the honour of the profession to continue in mutual love and affection."

CLINICAL EXPERIENCES WITH THE NEW ALKALOID, ERGOMETRINE*

BY

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At the Centenary Meeting of the British Medical Association in 1932 I had the privilege of showing to this Section the results of work that had just been done which clearly showed that the traditional clinical action of ergot was due not to the alkaloids ergotoxine and ergotamine, which had hitherto been regarded as all-important, but to a substance still unidentified.[1] At that time I was actively engaged in a combined work with the late Dr. H. W. Dudley in an attempt to identify this substance. The search was long and difficult, but was eventually brought to a successful conclusion by the isolation in pure chemical form by Dr. Dudley of a new alkaloid to which the name ergometrine was given. A description of this new alkaloid, together with its essential chemical, pharmacological, clinical properties, and method of isolation was given in March, 1935,[2] and subsequently amplified.[3 4 5 6]

It is now sixteen months since the manufacturing chemists of this country made ergometrine freely available to the medical profession, and it is fitting at this time to endeavour to assess the usefulness of the drug in clinical practice. Before dealing with purely clinical matters it is necessary to make certain remarks concerning the position of the new alkaloid.

Nomenclature

At one time some confusion threatened to arise by announcements made from three other widely separated laboratories of the successful isolation of new ergot alkaloids having high activity of the type under discussion.[7] These alkaloids were named ergotocin (Kharasch and Legault), ergostetrine (Thompson), and ergobasine (Stoll and Burckhardt). In the case of two of these substances the suggestion was made that they differed in certain chemical characteristics from the ergometrine discovered and described in this country. Any doubt which these claims may have aroused has now been dispelled. As the result of efforts made by Sir Henry Dale, a friendly exchange of samples has been effected between the different laboratories and, following comparative tests carried out by the various workers concerned, a combined letter has now been issued in which the four alkaloids are definitely stated to be identical.[8]

It is fitting to mention that the manufacture and sale of ergometrine is, and always has been, entirely free from patent rights, nor is the name in any way protected. From the time of its discovery the methods of preparation have been openly published for the benefit of scientific workers the world over. On the other hand, the three other names suggested for what is now admitted by all concerned to be one and the same alkaloid appear in all cases, at one time or another, to have been subject to some kind of proprietary protection; and the methods by which isolation was accomplished have not yet been published.

The name ergometrine, besides being free from commercial interests, is also the name proposed by the workers who in 1932 first demonstrated the presence of the new substance in ergot, and who in 1935 identified the substance as a new alkaloid and gave the first chemical and pharmacological description by which the substance could be identified by other workers. It may be supposed that these reasons have been effective in establishing the use of "ergometrine" as the scientific name of the new alkaloid in countries other than this. "Ergometrine" is also the name by which the substance is known in clinical medicine in this country and in Europe generally.

It should be mentioned, however, that the Council of Pharmacy of the American Medical Association has decided to rename the alkaloid for clinical use in the U.S.A.[9] This decision, it has stated, was made because the names in use were objectionable because (1) they were registered trade names, or (2) they were therapeutically suggestive. The first objection does not apply to ergometrine, and one must therefore suppose that the name was criticized because of its therapeutic suggestiveness. In answer to this it has been pointed out that the familiar word "ergot" has for the physician a much greater suggestion of special uterine action than has the Greek root to which objection is taken, and that by choosing "ergonovine" as the new name the American Council has shown that it has no difficulty in swallowing the "ergo" camel while straining at the "metrine" gnat. The decision appears to be a somewhat pedantic application of a principle which in certain instances may possibly be useful, but which even in the best circumstances inevitably results in creating confusion in medical literature.

In passing, it may be pointed out that the Council's action is in keeping with its decision a few years ago to alter the name of the pure crystalline vitamin **C**, which its discoverer Professor Szent-Gyorgyi and his collaborators had named ascorbic acid. In an inconsistent fashion, however, the Council takes no exception to the use in the United States of certain other names of far greater therapeutic suggestiveness than that of the substance under discussion. The alkaloids morphine and narcophine are examples of this. Finally, during more recent months no fewer than three other new ergot alkaloids[10 11 12] (unlikely to have any clinical significance) have been discovered, a circumstance which makes the name "ergonovine" a particularly unfortunate choice.

Characteristics of Ergometrine

Ergometrine has the formula $C_{19}H_{23}O_2N_3$; the molecule is therefore much smaller than that of the ergot alkaloids previously known. It is remarkable for the rapidity with which it is absorbed from the alimentary canal, a feature clearly differentiating it from the other ergot alkaloids. It is also reasonably stable, is resistant to boiling, and keeps well in crude ergot extracts. Prepared in the form of the hydrochloride or certain other salts, it keeps well in the purified form in dry state or in ampoules of solution. It is highly active in promoting contractions of the puerperal uterus, and even in large doses is free from undesirable side effects—again a feature which distin-

*Read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Oxford, 1936.

guishes it from the other ergot alkaloids previously known. Finally, the possibility of producing peripheral gangrene by its repeated use is apparently non-existent.

Mode of Action

It is frequently stated that, in contradistinction to posterior pituitary extracts, ergot preparations act on the uterus by causing prolonged firm contraction of the uterine musculature. Detailed study of mechanically recorded tracings of uterine activity show that in the doses used in clinical work this does not accurately describe the mode of action. The essential effect is the production of a rapid series of contractions which, after sufficient dosage, follow each other so closely that the uterus as a whole has no time to relax, and a state of spasm therefore results. It must be noted, however, that great muscular activity continues throughout this stage. As the effect passes off, the contractions again become spaced out, and again the uterus may be able to relax between individual contractions. This second stage tends to persist for many hours.

All the physiologically active ergot alkaloids behave in this manner, ergometrine being no exception. Ergometrine is, however, peculiar in the rapid onset of its action. After oral administration the uterine response appears in about seven and a half minutes, after intramuscular injection in three and a half minutes, and after intravenous injection in three-quarters of a minute.

It has been supposed by some that the action of ergometrine is a fleeting one—similar in this respect to the uterine action of histamine. This is quite inaccurate. The ergometrine effect lasts for as long as three to four hours. Although this may not be quite so long as the action of the ergotoxine-ergotamine group of alkaloids (which to be fully effective must be given by injection), it is long enough for all ordinary purposes. If in special cases a longer action is desired, the oral dose of ergometrine may be safely repeated at four-hourly intervals.

Use in Post-partum Haemorrhage

From what has been said it will be gathered that the chief use of ergometrine is in the prevention and treatment of post-partum haemorrhage.[6] Here the ergometrine effect is seen at its best. If after the delivery of the placenta the uterus is unduly relaxed, the administration of ergometrine, 1 mg. by mouth or 0.5 mg. by injection, will quickly cause a firm contraction of the organ. If severe haemorrhage has already set in, it is strongly recommended that the drug should be given by the intravenous route. For this purpose one-third of the standard size ampoule may be injected or, for those who wish accurate dosage, a special ampoule containing 0.125 mg. is manufactured. An effect may be looked for in less than one minute.*

It may pertinently be asked whether ergometrine has any advantage over pituitary extract in the conditions mentioned. I believe that it has. Pituitary extract tends to be erratic in its action, and in rare cases appears to be without effect. Moreover, it will occasionally cause alarming symptoms, especially if the patient is already suffering from that little-understood condition of "obstetric shock." In shocked patients a repetition of the dose is especially harmful, and in one case in my own experience, and in other cases which have been detailed to me by my colleagues, the repeated administration of pituitary extract has apparently been an important factor in determining a fatal issue.

This unfavourable action of pituitary extract is probably due to a constrictor action on the coronary vessels of the heart resulting in a depression of function of an already embarrassed organ. On the other hand, ergometrine in clinical doses has no influence on the cardiovascular system, and has in fact been given in full dosage to patients suffering from severe shock without any harmful effect appearing.

Use in Labour

Like the other ergot alkaloids, the mode of action of ergometrine makes it unsafe for use in labour.[6] Even when doses so small as 0.05 mg. are used, a dangerous alteration in uterine action may be produced. There appears to be little margin between a dose which merely augments labour pains and a dose which produces contractions following in such rapid succession that there are no intervals of adequate relaxation. Fœtal death may result. I cannot, therefore, subscribe to its use as a safe means of expediting labour.

Curiously enough, ergometrine if given before the onset of labour has but little effect on the uterus. The factor inhibiting contractions during pregnancy—whatever it may be—is normally so strong that the small doses of ergometrine which have been tried have usually failed to produce a recognizable action. Larger doses would in all probability have more effect, but for the reasons already mentioned I regard this proposal as prohibitively dangerous for both mother and foetus.

Caesarean Section

Ergometrine may be used as a preliminary to incision of the uterus during Caesarean section, but it will be found to have what is apparently a very variable action. The explanation of this is obvious when it is remembered that the effect of the drug is very slight until labour sets in. If, therefore, the section is performed during labour, prompt and firm contraction of the uterus may be looked for, especially if the substance is administered by intravenous injection. If, however, the patient is not in labour at the time of the operation very little effect will be apparent.

In spite of this, it is usually found that when the foetus has been extracted the uterus retracts well and quickly becomes firm. The contraction induced is not so powerful as that seen after the administration of pituitary extract, but for that very reason the uterine muscle is easier to sew up and the suture material is less likely to "cut out."

Incomplete Abortion

It has been stated by American workers[5] that the new alkaloid has been used with success in cases of incomplete abortion. My own experience is a little disappointing. Ergometrine certainly causes the uterine contractions to be speeded up, as can be easily observed in patients who feel a rhythmical uterine colic, but it is seldom that this stimulation is successful in causing the uterus to evacuate its contents when the unaided contractions have already proved to be of no avail. In this respect ergometrine is neither better nor worse than pituitary extract. It is, however, a reasonable drug to give when bleeding is free, and it is sometimes useful in tiding a patient over until other means of treatment are available.

Menorrhagia

Experimental work has shown that while the ergot alkaloids in clinical use are much less active on the non-pregnant uterus than on the parturient organ, they still have a definite effect, especially when given during menstruation. Ergometrine is decidedly more active in this respect than ergotamine. It is therefore reasonable to use this drug in cases of abnormal or excessive bleeding

* Direct injection through the abdominal wall of 0.5 mg. of ergometrine into the uterine muscle is another effective method of producing a rapid contraction, and is specially commended by Professor Beckwith Whitehouse.

from the non-pregnant organ in which the haemorrhage is not due to some condition demanding surgical treatment.

It may be mentioned that the effect on the non-pregnant uterus is much less than that of pituitary extract, or of the purified vasopressor principle, pitressin. These latter preparations, however, must be given by injection, and their employment is not free from the risk of inducing intense uterine colic and vasomotor disturbances if they are given during menstruation.

Involution of the Puerperal Uterus

The question of involution of the puerperal uterus has been left to the last because of the great variety of opinion which has been expressed on the subject. Personally, I believe that it is a mistake to attempt to interfere with the normal behaviour of the organ during the puerperium.[6] As has been pointed out, ergot acts by causing great muscular activity in the form of a rapid succession of contractions of the uterus, and its action is much more than to cause the muscle to become firm or, as it has been expressed, "blood-tight." This abnormal activity when maintained for eight or ten days is probably as much a hindrance as a help to the involution of the organ. While it may be true that occasionally a uterus is abnormally sluggish during the puerperium, and that blood and debris may in consequence accumulate within the cavity, and while this condition may perhaps be avoided by the routine and repeated administration of ergot preparations, I prefer to wait for a sign of abnormal uterine behaviour to appear before interfering with the normal action of the organ.

During the last year patients under the care of the Obstetrical Unit of the British Post-Graduate Medical School have been divided into two groups. One group has received ergometrine immediately after delivery and thrice daily during the puerperium. The other group, consisting of alternate patients, is used as a control and no variety of oxytocic drug is administered. Careful daily measurement is made of the height of the uterine fundus. Several hundreds of patients have now been observed, and, although a detailed analysis of the results has not yet been made, it is my impression that involution is exactly alike in the two groups. At one time ergotamine was substituted for ergometrine; no change in uterine involution was observed as the result of this. From these experiments it may be tentatively concluded that, while there is no evidence that the routine administration of ergot preparations during the first week or ten days of the puerperium is harmful, there is also no evidence that involution is accelerated.

Before leaving this subject I should like to make a special protest against routine and repeated administration of ergot in cases of actual uterine sepsis. If, as is usually agreed, the correct treatment of a septic hand or limb is to keep the part at rest, there can be little or no justification for reversing the principle in the case of the infected uterus.

Exophthalmic Goitre and Migraine

During the past few years a new use of the ergotoxine-ergotamine group of alkaloids has come into prominence. One of the characteristic pharmacological actions of these alkaloids is the inhibition of the effects which are normally produced when the sympathetic nervous system is stimulated. This property has been utilized in the treatment of certain diseases in which the sympathetic control is overactive, as, for example, in exophthalmic goitre. Now, ergometrine has been found to be almost devoid of any such effect on the sympathetic nervous system, and it is therefore extremely unlikely that this new alkaloid will be of any value in the conditions mentioned.

Finally, in certain cases of true migraine the ergotoxine-ergotamine group of alkaloids, when injected in doses of 0.25 to 0.5 mg., has been found to be extremely effective in aborting an attack, or in preventing its occurrence in those patients who have prodromal symptoms.[13] Since the mechanism of this action is quite unknown, only actual trial can answer the question whether ergometrine will be equally useful, and information concerning such tests is urgently needed. The advantages of a drug which can be carried in tablet form and which is rapidly effective when taken by the mouth are so obvious that before long ample clinical trial will certainly be made.

Superiority of the Purified Alkaloid

Finally, it may be asked whether there is any advantage to be gained by using the purified alkaloid in preference to the crude ergot extracts of the *Pharmacopoeia*. There are advantages. The crude extracts will in some patients cause nausea and vomiting, and their administration by mouth is sometimes impossible, as, for example, when a patient is still stuporous after an anaesthetic. On these occasions, and on occasions when very rapid action is essential, the advantages of the purified alkaloid, which can be given by injection, are obvious.

There is, however, another matter to be considered. As was shown in 1932,[1] and recently confirmed,[14] different batches of ergot vary considerably in their content of what is now known to be ergometrine. Hitherto no method of standardization has been available, and these crude extracts have necessarily been of an uncertain degree of activity, and hence inferior to the purified ergometrine when accuracy of dosage is desired. This fact may account, in part at least, for the varying opinions which have been held regarding the efficacy of the pharmocopoeial extracts. It is satisfactory to record that a recent work by Page and Hampshire[14] has resulted in a practical method being devised by means of which the ergometrine and ergotoxine content of crude ergot may be separately assayed. With the next revision of the *Pharmacopoeia* it is safe to assume that a fixed ergometrine content of official ergot preparations will be insisted on.

Conclusions

From what has been said it will be realized that ergometrine can with advantage be used whenever ergot therapy is indicated in obstetrical and gynaecological work. It will also be gathered that it is my own opinion that ergometrine has supplanted the alkaloids previously in use. The new alkaloid does all that they do, does it better, and does it with less inconvenience and risk to the patient. On the other hand, in certain medical conditions in which ergot preparations have been given with the object of restraining an overactive sympathetic nervous system, ergometrine is unlikely to be of value.

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THE CARE OF THE SEA-SICK

BY

JOHN HILL, M.D.

SURGEON, R.M.S. "AQUITANIA"

"Is there any cure for sea-sickness?" The oft-heard question, with its emphasis on cure, suggests a pathological disorder. Whether the condition be rightly or wrongly regarded as abnormal, it becomes in certain circumstances the rule rather than the exception. In fact, given appropriate conditions as to range of movement, its character and duration, and other attendant circumstances, it is doubtful if more than five per cent. of unhabituated individuals will remain entirely free from disturbing effects.[5] If we accept the definition of disease as a deviation from the normal average condition,[15] it follows that liability to sea-sickness *is* the normal average condition and not a departure therefrom. It is a normal response to an abnormal environment. The relief and ultimate immunity which tend to occur with repetition are likewise part of the normal response.

Adaptation

In the novice the normal response to adequate stimuli is sea-sickness. There is a world of difference between this and the equally normal response to identical stimuli on the part of the seasoned sailor. The gap is bridged by that miracle wrought in the nervous system by the process of adaptation. This consists essentially in the development of a series of what Pavlov[11 12] called conditioned responses, whereby new nerve paths and connexions are established. An important corollary is that whether the afferent stimuli initiating the reflex responses of sea-sickness be vestibular, visceral, or vasomotor, cerebral or cerebellar, or due to chemical changes in the blood, or to the interaction of endocrine glands, or to some obscure cause not yet dreamt of in our philosophy, the salutary process of adaptation remains fundamentally the same.

The establishment of immunity is Nature's cure, achieved by the multipotent *vis medicatrix naturae* ; and to expedite this process is the single aim of rational treatment. The details vary according to whether or not the disturbing stimuli arising from the movement of the ship are, in the beginning of the process, of a degree to which the nervous system is physiologically indifferent. Adaptation to "indifferent" stimuli consists in the gradual development of a series of conditioned reflexes whose responses are of a positive kind ; interference with the process may occur from extraneous stimuli having an inhibitory effect, but in the absence of such interference adaptation will develop imperceptibly and the patient will never know the misery of sea-sickness. On the other hand, if the initial stimuli are not "indifferent," the responses of the conditioned reflexes will have to be predominantly negative—that is, inhibitory ; extraneous stimuli interfering with the establishment of the desired conditioned reflex will hinder the development of inhibition.

The strength of stimulus to which the nervous system is indifferent varies with the inborn character of the individual nervous system and the combined effect of countless external conditions, some of which may be favourable and others unfavourable to the development of the desired conditioned reflexes. It is also determined to some extent by the strength of preceding stimuli. A slow, imperceptible increase in strength of stimulus marks the royal road to immunity, which unfortunately is seldom open. Conversely, one sometimes witnesses a gale at sea when the wind winnows the susceptible like autumn leaves ; next day the sea is relatively calm, and many venture forth fully recovered, unaware that, but for yesterday's storm, to-day's swell would assuredly have laid them low.

Conditions of Adaptation

Whatever the strength of the initial stimulus, the establishment of any conditioned reflex is subject to four fundamental requirements:

I. The simultaneous action of the conditioned stimulus and the unconditioned stimulus already established as the activator of the desired reflex.

II. The exclusion of all extraneous stimuli capable of producing responses antagonistic to the action of the conditioned reflex which it is desired to establish.

III. An optimum range of intensity of the conditioned stimulus.

IV. A receptive state of the nervous system.

I

The first requisite, the simultaneous action of conditioned and unconditioned stimuli, may be summed up in the common-sense axiom that one cannot expect to get one's sea-legs by lying in bed. It provides one reason why sea-sickness is less common among the crew of a ship than among passengers. If the sufferer is able to go about, he should be encouraged to walk *with* his feet rather than merely *on* them. The consequent increase in the range and intensity of proprioceptive stimuli reinforces the conditioned stimulus.

II

Stimuli interfering with the development of a conditioned reflex by producing their own antagonistic responses may originate either (*a*) in the conflict of sense impressions brought about by unaccustomed movement, or (*b*) in purely extraneous sources.

(*a*) The brain of the sea-sick patient is a welter of conflicting perceptions. Those derived from the retinae and oculomotor muscles record the position and movements of the head in relation to its immediate surroundings. But perceptions from other receptors, particularly the labyrinths, are simultaneously registering the position and movements of the body in space relative to the direction of gravitational force—movements in which the immediate environment (the ship) itself participates. These two groups of sense perceptions are incompatible, each competing for the nervous path of appropriate response. (If the patient, in spite of difficulty in balancing, is fit to walk on deck, and is consciously determined to adapt himself to his turbulent surroundings, it will often be found that some measure of harmony can be restored to his discordant perceptions if he can be persuaded to concentrate all his attention on the horizon while walking, keeping a "blind spot" for the intervening waves. The horizon is the only constant feature in a bewildering medley of perpetually varying forces—the sole remaining guide to the direction of the pull of gravity. If he succeeds in fixing his gaze upon this datum line of stability, he will find that his legs are now guided by his eyes in co-operation, not competition, with his labyrinths. Not only is discord resolved, but the establishment of a highly complex conditioned reflex is thereby aided through the reinforcement of an unconditioned one.)

(*b*) The extrinsic group of hindrances to the development of conditioned responses includes an infinite variety of disturbing stimuli, such as the thundering of a stormy sea, the creak of straining beams, or the malodorous emanations from galley ventilators. The most demoralizing of all is probably the dire example of other sufferers who have abandoned themselves to unrestrained vomiting. Rough weather at sea usually implies closed port-holes, and consequently, even in the best-ventilated ships, some interference with movement and exchange of air. It

seems reasonable to suppose that concomitant low barometric pressure may also affect the unusually sensitive. The main reason for the relative immunity of the crew of a ship as compared with passengers is that continued occupation sets up a barrier against all such extraneous stimuli. The disturbance caused by extraneous stimuli is much greater if they find a ready outlet. The patient with a history of dyspepsia, for example, is often (but not always) predisposed to sea-sickness, even though there be but scanty evidence that the stomach plays any important part in the production of the disorder. Similar predisposition is shown in the frequency with which sea-sickness afflicts those who have been guilty of dietetic or other excesses incidental to farewell parties before sailing. Not only do intrusive external stimuli hinder the development of a conditioned reflex (especially one so complex as that of adaptation), but they may actually disrupt one that has been previously established. Even the most hardened sailor may find himself disturbed by rough weather if his resistance has been impaired by anxiety, fatigue, or ill-health.

Extraneous stimuli have the effect of interfering with inhibition. The outcome is sea-sickness. But unusually strong stimuli produce a paradoxical result ; their interference strikes deeper, and affects, not the inhibitory process, but the underlying reflex itself. This may be illustrated by a personal experience, where a storm at sea produced widespread sea-sickness, but where at the first suspicion of real danger many victims lost all the despondency of sea-sickness in an ecstasy of hymn-singing.

III

The third essential for the development of a conditioned reflex is an optimum range of intensity of the conditioned stimulus. If the movements of the ship never exceed a certain minimum, no conditioned reflex can be established. Conversely, if they exceed a certain maximum, the cultivation of appropriate conditioned responses becomes increasingly difficult. In this connexion it should be remembered that different parts of a ship at sea are subjected simultaneously to movements differing in character and extent.

IV

The final requirement is a receptive state of the nervous system. This depends upon both mental and physical well-being. The importance of the mental state is so well known that the stolid person, whose intellectual vision is apt to be as restricted as his reflex responses, would dismiss the whole subject as " all a matter of nerves." It is beyond doubt that previous experience of sea-sickness is so damaging to the patient's self-confidence that sometimes the recollection alone is enough to induce malaise on a subsequent voyage. Even without this past experience many impressionable people embark with profound feelings of apprehension. One of the concepts which many of us acquire very early in life is the dread alliterative association between " sea " and " sickness." Even before the ancient Greeks spoke of *vaῦs*, a ship, and *ναυτία*, sickness, the two ideas must have been inseparably linked together.

In rough weather many of the sea-sick exhibit signs of an instinctive fear bursting the bonds of repression. The mental state is doubtless induced partly by the impact of conflicting groups of sense-impressions already described. Mental confusion and a sense of bewildered helplessness dominate the field of consciousness. The emotions are disturbed by an instinctive fear of, and revulsion against, a sense of instability which the unconditioned brain can neither foresee nor counteract. This psychic disturbance is in line with the tenets of the behaviourists—that the only two sources of inborn fear, as distinct from fear born of experience, are sudden unexpected noises and loss of support. A disconcerting commotion is certainly a frequent accompaniment when " the Atlantic's level powers cleave themselves into chasms " ; and a sense of inadequate support is a constant source of distress. Ever since the first Palaeolithic man ventured afloat in a hollow tree-trunk, *Homo sapiens* has been striving to adapt his reflexes to movement in three planes. But his sapient mind travels with more ease and comfort in four dimensions than his human body does in three. Amid all the luxury of a modern liner the sea-sick sufferer yearns for the reassuring stability of terra firma. Gonzalo in his anguish expressed the intensity of this craving when he " would give a thousand furlongs of sea for an acre of barren ground ; long heath, brown furze, anything."

The physical causes acting on the nervous system to delay its normal function of establishing conditioned reflexes are innumerable. Pain, fatigue, and other subjective phenomena fit more precisely into the category of disturbing extraneous stimuli already discussed. Their sources will be disclosed in answer to the first question that ought to enter one's mind, which is: " Are the present symptoms due solely to sea-sickness?" As to other sources of interference, it may be stated as a general principle that an indispensable preliminary to any mode of treatment designed to encourage adaptation is detoxication. Digestive errors, a loaded colon, glycosuria, or ketosis (so common in sea-sickness that it has been mistaken for a cause) will, if overlooked, frustrate all efforts to establish tolerance. Furthermore, the routine use of nervous depressants, whether for prevention or for treatment, defeats its own object when that object is the establishment of lasting immunity rather than temporary oblivion. Certain qualifications of this statement will be explained presently.

Varieties of Response

Much ink has been spilt in dissertations concerning the mode of origin of sea-sickness. The present hypothesis—that the condition is a natural consequence of man's two-dimensional being, and that immunity is acquired through the natural processes of adaptation—makes the effect more important than the cause. The clinical phenomena of sea-sickness manifest themselves in an endless variety of combinations, all of which are explicable only as disorders of the autonomic nervous system. Pavlov has shown how such disorders may arise from the conflict of incompatible reflex responses, in which excitation competes with inhibition. The response of the subject to environmental forces depends upon the outcome of this conflict, and this in turn is determined largely by individual temperament. " Temperament " in this context may be defined as the tendency of the nervous system to respond to conflicting stimuli in a manner which distinguishes the individual (or, more precisely, one group of individuals) from others. The nature of the response varies apparently according to whether excitation or inhibition is the predominant tendency.

The parallel between this condition in the human subject and the reactions of Pavlov's dogs is too seductive to be resisted. It is well illustrated in the classical experiment in which dogs were trained (by the establishment of conditioned reflexes) to respond positively to a circle of light thrown on a screen, and negatively to an ellipse. This achievement of discrimination was brought about by the gradual development of appropriate inhibitions. It was found possible to cultivate more and more delicate powers of differentiation—up to a certain point. Beyond that, there occurred a sudden and complete breakdown of the whole carefully elaborated system of conditioned responses. The further behaviour of the animals

seemed to be determined by their natural differences in temperament. The lively excitable type of dog showed impairment, and even complete loss, of inhibition. The docile inactive dog, on the other hand, had its positive conditioned reflexes gradually weakened and finally abolished; inhibition prevailed throughout all its responses.

There seems little doubt that sea-sick subjects show a similar tendency to fall into groups according to natural differences in temperament. The restless emotional type has been aptly compared to the "choleric" and "sanguine" temperaments of Hippocrates. It has equal points of resemblance to the "sympatheticotonic" type of a later epoch. In marked contrast is the "vagotonic" type—inhibited, negative, where the other is active, positive. These clearly marked types, however, are extremes, and therefore exceptional; the majority of cases fall into countless intermediate groups.

A second factor in the determination of the type of individual response appears to be the suddenness or otherwise of the onset of disturbing stimuli. My experience suggests that when the disturbance arises suddenly it arouses responses which are predominantly vagotonic, whereas if it begins gradually, and is continued for a relatively long period, the responses tend to be sympatheticotonic. This observation also is made with the reservation that most cases are of a mixed type.

Differentiation of Types

The pith of the matter lies in the words of Bohec[1]: *C'est qu'il n'y pas de mal de mer: il y a des maux de mer.* In shipboard practice it is not the extremes of vagotonia and sympatheticotonia that are commonly encountered, but a host of intermediate types. Since the maintenance of life itself depends upon a perpetual interplay of these two complementary forces, vagus and sympathetic, it follows that, however dominant the one may be, it can never entirely escape the influence of the other. The various *maux de mer* show the same diversity of range as the orange tints of the rainbow, which, however yellow, still have a shade of red in them, and yet can never be so red as to lose all their yellow.

The cognate problems of differentiation and treatment are complicated by (*a*) the simultaneous activation of both vagus and sympathetic; (*b*) the occasional involvement of only a portion of each; (*c*) the association of increased tone in one division of the autonomic nervous system with raised or lowered thresholds in the other[14]; (*d*) the fact that a case may at the outset incline towards one end of the vago-sympathetic scale, and ultimately lie definitely at the other. It is commonly early vagotonia which gives way later to sympatheticotonia. Kuntz[7] points out that when both vagus and sympathetic are stimulated simultaneously the heart responds first to the vagus and later to the sympathetic. This is explained on the assumption that the vagus is the dominant factor, but more quickly fatigued than the sympathetic. (*e*) Finally, the effects of stimulation of autonomic nerves are modified by the preceding tonus of the muscles supplied. Both vagus and sympathetic have the effect of raising tone when it is low and depressing it when it is high; their mutual action is therefore not wholly antagonistic.[7]

Clinical Interpretation

A question of very practical importance is how clinical signs and symptoms are to be interpreted as indicating the state of the autonomic nervous system. Thompson[14] has recently described a simple method of estimating *threshold* values in terms of response to physiological stimuli, a method which still awaits application to the problems of sea-sickness. In the estimation of *tone* values, I believe that reasonably accurate differentiation may be achieved; first, by attention to detail in the patient's account of the onset of his illness and his description of symptoms; secondly, by the careful assessment of the relative importance of all symptoms and manifest signs, and their correlation to form a composite picture.

As to clinical history, it must be admitted that it is often difficult to turn the patient's mind back to the earliest dim beginnings of his indisposition. Premonitory symptoms may have been trivial and transient; now they are swamped and submerged in subconscious memory by a flood of greater suffering which seems to him neither trivial nor transient. The question whether he felt slightly dizzy before his headache began is to him the height of irrelevance now that nausea has him in its melancholy grip and he is "vexed with a morbid devil in his blood that veils the world with jaundice."

Some Generalizations

The precise interpretation of symptoms is scarcely less difficult. For the sake of brevity I have condensed the study of several hundred cases into the following generalizations, which further experience may modify. They are not to be mistaken for either invariable rules or haphazard guesses.

1. *Pulse Rate.*—This is the easiest and earliest guide to differentiation of types. With the patient recumbent, it will often be found to be 50 or less in vagotonics, while in sympatheticotonics it is rarely under 80.

2. *Blood Pressure.*—Hypopietics are slow in acquiring immunity, and when sea-sick exhibit marked vagotonia, with a further fall in blood pressure. Sympatheticotonics show a rise of blood pressure in sea-sickness. When the weather is rough, but not severe enough to provoke subjective symptoms, blood pressure changes occur in the direction characteristic of each type. (Under the same conditions slight changes are found also in those who appear to enjoy complete immunity.) The difficulties and fallacies of isolated sphygmomanometer readings may be to some extent avoided by reliance on a sign noted by Price[13] as indicative of low blood pressure—namely, "an increase of the cardiac rate by more than ten per minute on standing after lying down." This is a very constant sign in vagotonia. But it must be interpreted with cautious reservations, because all the symptoms of sea-sickness are usually aggravated by standing and relieved by lying down. Irregular spurts of quickened pulse often coincide with waves of nausea and increased unsteadiness.

3. *Vertigo.*—Although this is a classical symptom in labyrinthine disturbances, whether due to disease or to rotation experiments, and bulks largely in textbook descriptions of sea-sickness, real vertigo is less common than is supposed. It is true that many patients complain of "dizziness," but it is difficult to get an accurate description of the sensations so described. What many suffer from is a confused sense of ocular imbalance, probably due to heterophoria and a conflict of sense perceptions. Others describe as "dizziness" symptoms which seem to originate in various forms and degrees of ataxia. The severer cases of (true) vertigo are vagotonic. In many sympatheticotonic patients it is not a primary symptom, but secondary to nausea and vomiting.

4. *Headache.*—Like vertigo, this is often an early symptom in vagotonia, but in sympatheticotonia it is more commonly a sequel to nausea and vomiting. Children and young adults rarely complain of it. Headache definitely associated with vertigo is likely to be of vagotonic origin, and may be occipital, vertical, or temporal. Frontal headache without marked vertigo is probably sympatheticotonic.

5. *Nausea and Vomiting.*—Although closely associated in sea-sickness, these symptoms are by no means insepar-

able. Of 108 cases quoted by Maitland[9] fifty-two suffered from nausea and vomiting ; twenty-two had nausea without vomiting ; thirty-four vomited without nausea. When both symptoms are present nausea almost always comes first ; it may therefore be said that about 70 per cent. of cases of nausea are followed by vomiting and 30 per cent. are not. The extent to which vomiting relieves nausea is an important variant. The vagotonic often gives a history of vomiting on one occasion only or at long intervals. The act tends to be sudden and violent, not heralded by nausea or other aggravation of the general feeling of malaise. But the patient whose vomiting recurs frequently, although it brings little or no respite from nausea, is likely to be predominantly sympatheticotonic. It is usually taken for granted that the sea-sick person will not want to smoke. To the sympatheticotonic patient the very thought of tobacco is nauseating. Yet in stormy weather I have known sufferers from headache, vague "dizziness," malaise, and impaired appetite who could still find solace in a cigarette. These were doubtless extreme vagotonics, less liable to be disturbed by the pylorospasm generally attributed to tobacco.

6. *Lethargy*.—Sleep has an important bearing, so far unexplained, upon the problems of sea-sickness. It often has a strikingly recuperative virtue, the generalized inhibition which accompanies it favouring in some way the restoration of autonomic balance. This effect is not limited to the period of sleep, but usually continues for some time afterwards. Drowsiness, apathy, and occasionally mental hebetude without actual somnolence, are signs of vagotonia. The sympatheticotonic will often complain of broken, restless sleep, disturbed by dreams.

Treatment

When the ship's movement constitutes a stimulus to which the nervous system of the unhabituated individual is not indifferent, the adjustments involved are largely inhibitory. Sea-sickness results from failure of adjustment ; recovery consists in the establishment of appropriate conditioned responses. It is a familiar observation, not confined to the study of sea-sickness, that the placid temperament (vagotonic) yields more readily than the excitable (sympatheticotonic) to the development of inhibitions. The profound lethargy of mind and body exhibited by sea-sick vagotonics suggests that inhibition in them is excessive, whereas in the sympatheticotonics it is plainly deficient. Thus the problem of treatment resolves itself into the encouragement of appropriate inhibitory responses.

Excessive Inhibition

Excessive inhibition may be attacked from one or both of two directions—by (1) depressing the inhibitory forces, or (2) stimulating the processes of excitation.

(1) The depressant action of the alkaloids of belladonna on the parasympathetic system is well known. There is still some controversy as to whether atropine or hyoscine is the more efficacious, or whether they are not in fact fundamentally identical. I have found the tincture of belladonna better than either of these alkaloids, which are best reserved for cases where the stomach rejects fluids of every kind. A recent authority[6] states that "twenty minims of the tincture may be given three times a day without toxic effect and with relief of sea-sickness." I have usually found that if no definite relief follows a dose of thirty minims, spread over four hours, the patient will respond better to other treatment. When vomiting is readily provoked, a useful method of inhibiting the vagus is sublingual application of three or four drops of a 1 per cent. solution of atropine sulphate, which is equivalent to the now unofficial liquor atropinae sulphatis. It is rapidly absorbed, does nothing to excite vomiting, and is quicker and more convenient than hypodermic injection. Suppositories containing hyoscine—for example, "vasano"—are also valuable.

(2) In the early stages of vagotonic sea-sickness there is undoubted value in stimulants such as strychnine or caffeine either medicinally or as strong tea or coffee. The effect of adrenaline is too transitory to be of much help. Ephedrine is useful in prophylaxis, especially combined with atropine, but I have not yet been persuaded of its curative value. Vigorous exercise, preferably in the fresh air and in the form of some deck game which offers distraction as well, has saved the self-respect of many a wavering vagotonic.

It is in these cases that the routine use of cerebral depressants is to be deprecated. The patient needs every encouragement to strenuous exertion in order to overcome his inhibitory tendencies. Vagotonics, even when frankly sea-sick, derive marked benefit from eating a little—greater benefit than is to be explained by the nutritive value of what they eat. Therefore nothing should be given which impairs appetite or digestion. (There are few greater offenders in this respect than the ever-popular chloretone.) Finally, if there is any drug which the vagotonic, usually lethargic to the point of somnolence, does not need and should not have, it is a hypnotic. His widespread inhibitions call for correction, not encouragement.

It is variously estimated that vagotonia is more common than sympatheticotonia. I have certainly found it more common among men, especially those who have been long at sea without acquiring immunity. But sympatheticotonia is more common among women and children. (Although infants, having not yet grown to orientation, are immune, I have not found the absolute immunity among older children that is commonly attributed to them. If the disturbing movement begins early in the voyage they are no less susceptible than the average adult ; but given a favourable environment, away from sea-sick relatives, they become adapted with amazing rapidity.) The idea of vagotonic prevalence may arise from the fact that long before the description of vago-sympathetic states (by Eppinger and Hess in 1910) belladonna and its alkaloids were used empirically in the treatment of sea-sickness. But there is no panacea to be found in "all the drowsy syrups of the world," or even all the alkaloids of belladonna. As recently as 1929 Pace,[10] using the total alkaloids in twenty-eight cases of persistent vomiting and seventy-seven cases less grave, claimed successful results in all. He treated seventy-nine cases prophylactically, reporting only two failures. This makes 182 successes out of 184, or 98.9 per cent. But the problem is not so simple as these figures suggest. Although atropine in ordinary therapeutic doses is a specific vagal depressant, its pharmacological action is by no means confined to depression of the parasympathetic system. It has recently been shown[3] that small doses (up to 0.25 mg., or 1/240 grain) have a stimulant action on both the sympathetic and, to an even greater degree, the parasympathetic. Conversely, large doses (to which tolerance can be rapidly acquired) paralyse both sympathetic and parasympathetic. When the vomiting of sea-sickness has been arrested by "persevering" with atropine until all gastro-intestinal activity has been abolished, the patient's mouth and tongue are parched, his throat too dry to swallow, and his field of vision a confused blur, the last state of that man is worse than the first. These cases are not true vagotonics.

Deficient Inhibition

The treatment of the excitable (sympatheticotonic) subject is in essence the reverse of that of the vagotonic. Inhibitory responses have to be developed and encouraged

in every possible way. Inadequacy of inhibition may be countered by (1) depression of sympathetic activity, (2) stimulation of the parasympathetic, or (3) a judicious combination of both methods.

(1) Depression of Sympathetic Activity

It is here that sedative drugs are of the greatest value. If the patient's type can be surmised before sailing, sedatives are doubly useful as a form of premedication to prepare him or her for the ordeal of the voyage, which is commonly approached with all the uneasy qualms of a patient prepared for the operating table. *Chloretone*, in the proprietary "mothersill," ranks high in popularity. It has been vaunted as a specific sedative for the vomiting centre.[4] It is true that it often arrests vomiting, but in many of these cases nausea remains unrelieved, so that the patient feels (and is) no better. Chloretone should be used as an adjuvant to other remedies, and reserved for cases where vomiting is excessive.

In the absence of severe vomiting *alcohol* in various forms produces some transitory indifference to unpleasant movement. Brandy, gin-and-bitters, and champagne are the three favourites, but the choice is largely a matter of personal taste.

The *barbiturates* are useful and usually well tolerated, but some of them have an unsavoury reputation for toxicity. In sea-sick but otherwise apparently healthy sympatheticotonic persons I have used veronal, luminal, gardenal, medinal, sodium amytal, somnosal, and nembutal, with satisfactory results. McLaughlin[3] has reported favourably on the value of nembutal in seventy cases. He classified them according to whether the dominant symptom was headache (fifteen cases) or vomiting (fifty-five cases). The second group gave the better results; 88 per cent. are stated to have improved. It is a reasonable assumption that the first group, in whom headache was more prominent than vomiting, were vagotonic, and therefore not suitable cases for this treatment.

One serious disadvantage applies to most hypnotics in the treatment of sea-sickness: the benefits to the patient last only as long as the action of the drug, whereas natural sleep has a distinctly restorative effect. This objection applies rarely, if ever, to *bromides*, which are among the most reliable of all sedatives in sea-sickness. Pavlov found bromides to have a specific selective action upon the cerebral cells involved in his experimental dogs. Thus, when inhibition had been experimentally impaired, rectal administration of bromide not only led to restoration, but caused the conditioned responses to be even stronger than before. There is some doubt nowadays concerning the superiority claimed for triple bromides over equal doses of a single salt. In either form the drug is an invaluable sheet-anchor in stormy weather. Its favourable action on inhibition is usefully reinforced by prescribing half-hourly doses (amounting to 40 to 60 grains in four hours) and emphasizing the importance of punctuality in repetition. An attitude of vigilance so produced helps to distract the patient's attention from distressing subjective symptoms; but even more benefit comes from the frequent and regular (that is to say, monotonous) repetition of a stimulus, which Pavlov showed to be one of the surest ways of developing inhibition.

Even in the most obstinate cases bromides seldom fail if combined with chloral hydrate. Many highly excitable patients absorb *bromide and chloral* more quickly and surely by rectum than by mouth. It has been found that bromides have no effect on decerebrate animals, on whom chloral hydrate acts as well as on normal animals, or even better; presumably bromides act upon the cortex, and chloral on the thalamus and/or brain-stem. This would explain their synergistic action, chloral favouring inhibition by obstructing extraneous stimuli, bromides by slowing down reflex activity.

It seems superfluous to add that all efforts at sedation must be reinforced by the careful exclusion of all disturbing (positive) stimuli which tend to interfere with the (negative) process of inhibition. But it is just in this respect that many efforts lead to failure and disappointment. Auxiliary measures include protection, for a time at least, from every visual, auditory, or other stimulus that it is possible to exclude.

Even when all efforts to check vomiting are fruitless, sedative treatment brings a certain degree of amnesia, so that the patient after recovery can contemplate the return voyage with fewer misgivings.

(2) Stimulation of the Parasympathetic System

This is often a more satisfactory method of overcoming sympatheticotonia. Even the most excitable patient will in time become exhausted by repeated vomiting. It then becomes desirable to have some other weapon in one's armoury than varying degrees of narcosis.

Pilocarpine is often effective in doses of 1/8 to 1/6 grain hypodermically, provided that none of the usual contraindications are present. It is doubly useful if given early. In functional derangements such as sea-sickness it is always difficult to assess the true value of hypodermic medication. The needle is a potent vehicle of suggestion. But pilocarpine by the mouth, combined with bromide, and given in half-hourly doses amounting to as much as 1/4 grain in four hours, is not only well tolerated but wholly beneficial, with no unpleasant after-effects. I have similarly used ergotinine citrate, ergotamine tartrate ("femergin"), physostigmine and its isomer "prostigmin," but so far have not found any of them superior to pilocarpine, or so well borne by the stomach.

The most rational parasympathetic stimulant is *acetylcholine*. Dale[2] has shown that this is identical with a chemical substance produced in muscular tissue in response to stimulation of parasympathetic nerves. It is thus a specific vagal hormone, bearing the same relation to the parasympathetic system as adrenaline does to the sympathetic. It reduces blood pressure and slows the pulse. It is useless given orally, reputedly dangerous intravenously, and must therefore be administered hypodermically. ("Mecholyl," or acetyl-beta-methylcholine chloride, is said to be equally efficacious by the mouth, but at the moment of writing is not available for trial in sea-sickness.) Despite the mischievous influence of suggestion, a blessing to the patient but a curse to the detached observer, I have satisfied myself that acetylcholine, especially in conjunction with oral bromide and chloral, is of outstanding value in certain cases of sea-sickness. It seldom fails to relieve headache, and nausea often disappears in a very gratifying way. Patients have reported that it abolished their sensations of vague abdominal discomfort, symptoms which are very constantly present, even in the absence of recognizable nausea. Its specific value, in appropriate cases, is indicated by the restoration of that feeling of well-being which is noticed only by its absence, and the loss of which is the first hint the patient gets that all is not well with him.

(3) Combination of Both Methods

The most important single fact in sea-sickness is that nearly all cases are "amphotonic," combining both vagotonic and sympatheticotonic elements. It therefore follows that the best hope of success in treatment lies in

a prudent combination of remedies suited to both extremes, particular attention being paid to that which predominates at the time. It must also be remembered that prolonged sea-sickness sometimes presents a kaleidoscopic picture which changes from day to day; and previous knowledge of a patient, even in sea-sickness, is not always a sure guide to the nature of his future responses. He may be taken unawares by his first attack, presenting a typically vagotonic picture; next time, under apparently identical conditions, excitement and apprehension so act upon his nervous system as to determine an equally characteristic sympatheticotonic response.

Attempts have recently been made to meet the need for combined attack on both vagus and sympathetic by the introduction of compound preparations, such as "bellergal" (Sandoz), which contains belladonna alkaloids, ergotamine, and luminal. The simultaneous administration of belladonna and ergotamine is theoretically sound, but there are grave practical objections which must apply to any stock remedy combining two or more potent drugs with different (though not strictly antagonistic) actions. It must be remembered, when we speak of vagotonia and sympatheticotonia, that fundamentally these are, in their extremes, pharmacological concepts rather than clinical entities, having been based originally on the effects of artificial stimulation or depression by drugs with a selective action, such as adrenaline (a sympathetic excitant), atropine (a parasympathetic depressant), physostigmine, pilocarpine, and ergotamine (sympathetic depressants). The term "sympatheticotonia" implies undue sensitiveness to adrenaline, or to any other substance, condition, or circumstance having a positive action on the sympathetic system. It is evident that this includes belladonna and its alkaloids, which weaken the compensatory effect of the parasympathetic. Therefore in sea-sickness the sympatheticotonic requires very much less belladonna and more ergotamine, just as the parasympatheticotonic requires less ergotamine and more belladonna, than can ever be found in any combination devised for use in all cases.

Furthermore, the addition of luminal is questionable for two reasons: (1) Of most vagotonics it can be said that if a small dose of luminal does them no harm it certainly does them no good. (2) Individual tolerance in my experience varies more with luminal than with either belladonna or ergotamine. Luminal and its congeners are a popular form of self-medication among many Atlantic travellers, and I have encountered various degrees of addiction. Many of these could have got no cerebral sedative effect from "bellergal" until they were on the verge of alkaloidal poisoning. A still graver objection arises in the case of the patient not habituated to luminal if his symptoms and signs show pronounced vagotonia or sympatheticotonia. "Bellergal" contains bellafoline 0.1 mg. and ergotamine tartrate 0.3 mg. to 20 mg. of luminal. Now, there are many vagotonics who require in one day as much belladonna alkaloid as is "balanced" (sic) in "bellergal" by 3 or 4 grains of luminal. The sympatheticotonic who takes enough ergotamine to give him a chance of relief is in equal danger of becoming completely narcotized. The same practical difficulties apply to "cafinal compound" (Bayer), in which are assembled (1) luminal, (2) caffeine, (3) scopolamine, (4) ephedrine, (5) papaverine, (6) atropine, and (7) strychnine. Such a complex preparation cannot be expected to provide the best possible treatment save in the very rare case which shows neither symptoms nor signs that can be classified as either vagotonic or sympatheticotonic, and where the patient's responses to the various alkaloids are balanced with the most incredible exactitude.

The well-worn aphorism that we are treating not diseases but patients is as apt in this context as in any other. The wise physician, after a careful study of the clinical picture presented by his patient, sets out to treat sea-sickness with a pocketful of diverse remedies, which he will blend according to his judgement. Although it is a favourite gibe that the multiplicity of remedies proves the futility of them all, this cannot be truly said of sea-sickness, for the very evident reason that there is no single, invariable cause, but a large and very variable combination of causes. It is only chance (by which we mean a concatenation of circumstances which we can neither foresee nor explain) that determines which of these manifold combinations will play the leading part. Therefore a panacea against sea-sickness is but an idle fantasy.

Summary

Sea-sickness is a normal reflex response to disturbing stimuli. Immunity consists in the development of appropriate conditioned reflex responses. It is as natural for the novice to be sea-sick in stormy weather as for the toddler to stumble or the inexpert golfer to foozle his drive. In all three cases the reason is that the necessary conditioned reflexes have not yet been established. The effects of the disturbance are manifested in various degrees of autonomic imbalance. The care of the sea-sick consists in (1) careful attention to all the circumstances influencing the development of conditioned reflexes, and (2) evaluating in each case the relative preponderance of sympathetic and parasympathetic elements, aiming at the restoration of normal balance by a judicious combination of sedation and stimulation.

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A meeting of the court of directors of the Society for Relief of Widows and Orphans of Medical Men was held on October 7th, with the president, Mr. V. Warren Low, in the chair. Nine new members were elected, and the deaths of three were reported; also the death of a widow in receipt of grant whose late husband became a life-member in July, 1921, on payment of £26 5s. He died in June, 1922, when his widow and two orphans came on the funds, and received £1,390 in all from the society. Relief is only granted to the widows and orphans of deceased members. Membership is open to any medical man who, at the time of his election, is resident within a twenty-mile radius of Charing Cross. Three widows of deceased members applied for relief; one, 77 years of age, was voted a yearly grant of £75, and the two others, being under 65, were voted £60 a year each. The sum of £630 was voted as a Christmas present, each widow to receive £10 and each orphan £5. The directors desire to bring to the notice of young medical men and the newly married the advantages of joining the society, which in 1938 will have been in existence 150 years. The annual subscription for a member under 35 at the time of election is two guineas; if over 35 but under 45, three guineas; and over 45, four guineas. There are special terms for life membership. The secretary will forward full particulars on application at the offices of the society, 11, Chandos Street, Cavendish Square, W.1.

GLAUCOMA AND SEPSIS*

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Metabolism is carried on mainly by water, which passes out from the arterial and is absorbed back into the venous circulation. As the veins are both much larger and more numerous than the arteries the energy of absorption must be quite considerable to enable venous pressure and the circulation of tissue fluid to be maintained. The aqueous humour, which contains practically no colloid, is readily absorbable and is in contact with abundant ciliary veins, so that inflammatory interference with absorption from the anterior chamber and ciliary body must be a potent cause of hypertension. The structure and relations of the pectinate ligament favour the passage of fluid to the ciliary veins, one long side of the ligament being in contact with the ciliary body, the other with the aqueous humour. The contrast between the open-meshed tissue of the roomy spaces of Fontana and the closely appressed fibres over the canal of Schlemm is quite striking, and one can see that the aqueous humour is continuous with the fluid which permeates the ciliary body. In addition, there is experimental evidence to show that absorption from the anterior chamber by the ciliary veins is quite active. As the iris comes forward the spaces of Fontana will be obliterated before the canal of Schlemm is affected, so that there is good reason to conclude that hypertension is due to insufficiency of the canal rather than to obstruction of it. It is evident, too, that the amount of aqueous humour that can normally pass through the canal alone is too small to prevent hypertension. Trabeculae in the canal oppose quite an obstacle to the movement of fluid, serving, with the pressure in the external veins, to buffer the outflow of the aqueous, and as resistance not only rises with hypertension but is as the square of speed, increased velocity of circulation of the aqueous humour or of the blood can afford practically no relief to the tense eye-ball.

Congestion of the Ciliary Body

It is not usually recognized that inflammatory congestion of the ciliary body is the cause of both hypertension and the shallow anterior chamber in glaucoma. Increased intraocular pressure is due to the tendency for more fluid to pass into the eye than can escape from it. Paracentesis shows that there is no material obstruction to the passage of fluid between the chambers, and, as the intake of the anterior chamber is so very much greater than the outflow, the shallow chamber cannot be due to loss of fluid and can only be caused by the iris being carried forward by the swollen ciliary body. That the shallow chamber is not due to hypertension can be shown by passing a hypodermic needle into the vitreous chamber; if pressure be raised and relaxed the iris will dilate and contract, but it will not advance. This observation has recently been confirmed for me by Dr. Stuart Ramsey of Montreal. Increase of bulk in the eye is due to infiltration by leucocytes and to retention of fluid by inflammatory colloids, largely in oedematous cells, as well as to interference with the outflow, but the movement of leucocytes is so slow that hypertension can be stated in terms of the circulation of fluid. The excess of colloid which is found in the aqueous humour in glaucoma shows that the ciliary epithelium has been damaged and inflammatory fluid forced through it into the chambers of the eye—a further cause of hypertension. A similiar condition occurs in the formation and bursting of Schnabel's bullae, but when they are produced the hypertension is relative and due to maintenance of free leakage from the anterior chamber. If the leakage be established by passing a hypodermic needle into the chamber, the needle will clog in a comparatively short time, showing that the amount of colloid in the pathological aqueous is considerable. That hypertension is due to uveitis is evident from cases of posterior glaucoma, which run their course without cyclitis and practically without increased intraocular pressure.

Specific Infection

The question naturally arises why it is that, with so many types of cyclitis, glaucoma occurs in only one of them. This must be due to specific infection, and the answer is, I think, suggested if one considers the size and consistence of a carbuncle, particularly the length of time required for its resolution, and the effect of brawny swelling of the ciliary body, which may be extensive enough to abolish the anterior chamber upon pressure in the eye. This, of course, suggests staphylococcus infection. About thirteen years ago I reported the results of the bacteriological examination of eight cases of glaucoma, here in Oxford, at one of the many interesting meetings of the Ophthalmological Congress. Seven cases showed a growth of staphylococci, one was negative, and there was no trace of any other germ. Five cases gave a very slow growth, confined to tissue which was removed from within the eye at operation and immediately plunged beneath the surface of an agar slope. We were disposed to consider that this growth was due to an attenuated type which was probably anaerobic. In two cases we could not say whether this strain was present or not as there was a profuse growth of aerobic staphylococci which smothered the tissue and involved the medium. In the last case the tissue was accidentally brought in contact with strong antiseptic, and there was no growth. That contamination should in every case result in a pure growth of the same germ seems to be quite improbable.

Evidence of infection is particularly strong in posterior glaucoma. The reported cases are not characterized by uveitis or hypertension, but by inflammation of the optic nerve with selective absorption of its fibres. There is no resemblance between the flat regular cupping found in uveal glaucoma and the excavation showing great loss of substance but no sign of pressure which distinguishes the chronic cases. The distinguishing feature of posterior glaucoma is diffuse inflammation of the optic nerve, which has been shown in different cases to extend a variable distance up its stem. The conditions present are such as can only be produced by a local cause, and the chronic course indicates that the infection can be comparatively non-virulent. That the infection is not always of low virulence is shown by a case in which the vision dropped from normal to nothing in six weeks, and the symptoms were so slight that even though the patient had been warned to watch her sight, the first thing she noticed was that she was colliding with people and things. This unfortunate woman had had nose and throat operations, but residual infection was neither recognized nor treated and the possibility of reinfection was ignored. These two types of glaucoma represent extremes, but cases showing some characteristics of both must be common.

Glaucoma runs its course like an infectious disease; if left to itself there comes a time when there is neither pain nor inflammation, no hypertension, no recurrences, and no sight. The various types of the disease may be accounted for by the differing virulence of a very variable germ, acting on tissues which oppose greater or lesser resistance to it.

Staphylococci can practically always be found in the nasopharynx, and not only had all the cases reported

* Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Oxford, 1936.

above chronic sinusitis but I was led to investigate the question because for some years I had noted that my glaucoma patients suffered from old nasal disease.

Naturally it will be pointed out that, as catarrhal troubles are so common and glaucoma relatively rare, the former cannot be the cause of the latter. The same argument may be used regarding deafness, but no one considers that catarrhal deafness is primarily an ear disease; infections of the eye and of the ear are practically always secondary. Why these organs become involved in one person but not in another depends principally on individuality, which we cannot analyse, and probably also on the strain of the germ causing the infection. That such involvements do occur is a matter which is much too frequently demonstrated in ordinary experience.

The opposition argument may also be urged. A friend whose opinion must be respected writes that his glaucoma cases show neither symptoms nor *x*-ray signs of sinusitis. I fear, however, that he has not excluded chronic sinusitis, which is almost always ignored and left unchecked, to cause, usually only after many years, its train of permanent disability.

Nasal treatment and sinus operations, the effects of the various rays and high-frequency currents, of anti-staphylococcus serums and toxoids, and of air-conditioning are beyond the scope of this paper, but compulsory use of the last as a preventive measure, especially in crowded schoolrooms, should be seriously considered. As the dictum of the surgeon of fifty years ago against operating in chronic glaucoma is still sound, some early and effective treatment of the underlying cause must be found if we are to prevent these most distressing cases.

Conclusion

The cause of glaucoma can only be determined by further systematic observation, but with so many indications all pointing to the same conclusion, with no other probable cause of the disease apparent, and with chronic septic infection established practically in contact with the orbits, surely it is not wise simply to ignore the whole matter. It is about eighty years since the nature of glaucoma was first recognized, yet only last year a paper was read which stated: "We do not know the cause of glaucoma." This may be so, but it is not to the credit of ophthalmology, and an adequately organized attack on this problem under control of a central committee is long overdue.

Residual infection and reinfection must be dealt with by the rhinologist, but the prevalence of disease of the upper air passages and its deleterious effect on the chest, eye, and ear make one recognize that air-conditioning as a preventive measure is as important as the treatment of water.

THE SEDIMENTOMETER

A PHOTOGRAPHIC APPARATUS FOR AUTOMATIC RECORDING OF BLOOD SEDIMENTATION RATE

BY

TERENCE LEE, M.B.Melb., M.R.C.P.

MEDICAL OFFICER, PRESTON HALL SANATORIUM, KENT

Recently the estimation of the blood sedimentation rate has become a popular biological test in the evaluation of the general response of the patient to disease. The technique of the test is easy enough, but the chief objection from a practical standpoint is the time needed in order to obtain the readings. General physicians and practitioners are too busy to do this simple yet reliable test themselves, while in institutions such as sanatoria the medical staff has often to rely on non-qualified observers to take the readings. It is on account of this that the test is usually made as simple as possible, and a single reading at the end of a definite time interval, usually one hour, is the only observation taken. On the other hand, to obtain the maximum information the behaviour of the blood sedimentation should be studied throughout the whole time it is sedimenting. Cutler,[1] who has studied this extensively, reads the sedimentation fall every five minutes throughout an hour, and plots the results on graph paper, plotting the time in minutes along the abscissa and the height of the clear plasma above the sedimenting column of red cells along the ordinate. He has found that the more abnormal the blood rate the more rapid is the fall during the early stages.

The apparatus known as the sedimentometer dispenses with the need for an observer, and at the same time will take an accurate and permanent record throughout as long a period as may be considered necessary. The Cutler tube,[2] as used at Preston Hall, holds one c.cm. of blood in a column fifty millimetres high with a relatively wide cross-section. This tube is a very convenient one to use in the sedimentometer.

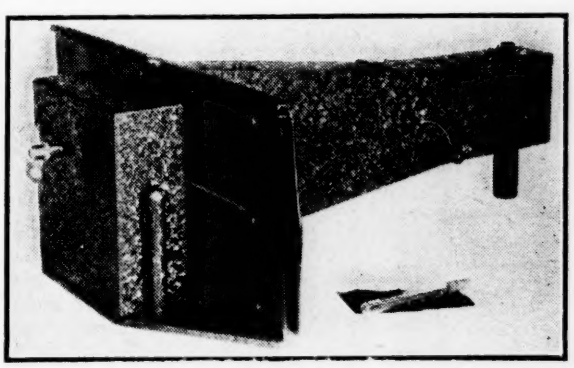

Fig. 1.—Photograph of the sedimentometer.

Photographic Recording

The principle on which the sedimentometer works is simple. If a beam of light passes through a column of sedimenting citrated blood it will be interrupted by the opaque mass of red cells below, but will be readily transmitted through the clear blood plasma above. If a sheet of bromide paper placed behind the tube is exposed to this beam of light and then developed in the usual way, the upper part will come out black, while the part with the opaque red cell layer will be white, since no light can get through. The border between the white and black parts marks the height of the sedimenting column at the time. In order to obtain a continuous record throughout the time the blood is sedimenting, the bromide paper must move past the tube at a slow, even speed. A lens placed between the sedimentation tube and the photographic paper corrects the diffusion of light, and a sharp photograph is obtained; at the same time the millimetre markings on the tube are recorded as white lines on the print. It may be noted that such an instrument (Fig. 1) will also produce an enlarged image of the blood column if such is desired. At the present moment a new method is being worked out by which a few drops of blood from a needle-prick can be used to estimate the blood sedimentation rate in a very short and relatively wide-bore tube.

In using the sedimentometer ordinary plate-holders are loaded with bromide paper in the same way as one loads plates in the old-fashioned plate camera. The plate-holder is placed in the cross arm at the back of the sedimentometer, and the slide withdrawn from the plate-holder. The clock which drives the plate across the

central slit in the cross arm is set going. Then the fifty-millimetre Cutler tube filled with citrated blood is placed in the special holder behind the ground-glass window and the exposure begins. At the end of sixty minutes the plate automatically stops so that the sedimentometer can be unloaded at any convenient time. *X*-ray developer is quite good enough to develop the paper.

Interpretation

After development a picture similar to those illustrated (Figs. 3–6) is obtained. A diagram (Fig. 2) will help in its interpretation. Above is a rough parallelogram ABCD ;

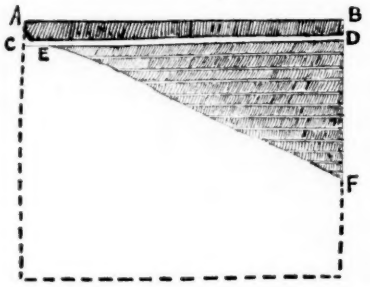

Fig. 2.—Diagrammatic key to the reading of a sedimentation chart obtained from the sedimentometer.

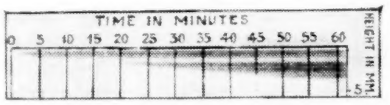

Fig. 3.—Photograph showing a normal sedimentation fall. The sedimentation index (the reading in millimetres at the end of an hour) is 4 mm. The normal index is 2 to 8 mm. for men and 2 to 10 mm. for women.

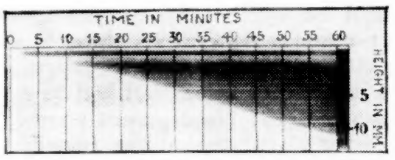

Fig. 4.—A diagonal line indicating a quiescent lesion ; sedimentation index 11¼ mm. If the time interval between starting and shutting off the machine is known the sedimentation reading for intervals greater than one hour can be automatically recorded by measuring the length of the column at the end of the graph—in this case the sedimentometer was not shut off until 1¼ hours had elapsed ; thus the reading for 1¼ hours is 13¼ mm.

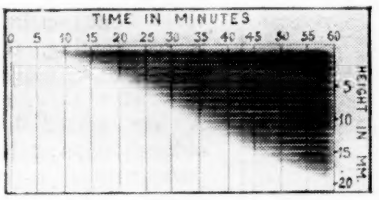

Fig. 5.—Diagonal curve graph ; this indicates moderately active disease. Sedimentation index 19¼ mm.

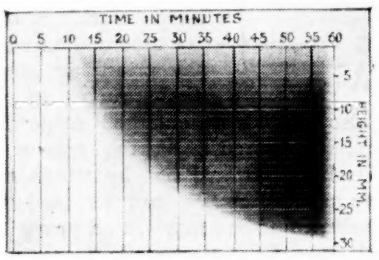

Fig. 6.—The vertical curve ; this indicates markedly active disease. Sedimentation index 29½ mm.

this is the space above the fluid level. A wide line CD which is white in the photograph is the meniscus ; the readings are taken from the lower margin of this line. The dark triangle EDF represents the gradually increasing plasma column, while the white area below that is the unexposed paper protected by the opaque blood column. It will be noted that EDF is broken by a number of horizontal lines, these lines being the actual millimetre markings on the tube. If desired, the sedimentation curve may be copied off on to Cutler charts. For this purpose there is provided a special transparent rule marked off in twelve equal spaces, each space equal to the distance travelled by the plate in five minutes. The sedimentometer can be used in an ordinary room, using artificial light or daylight.

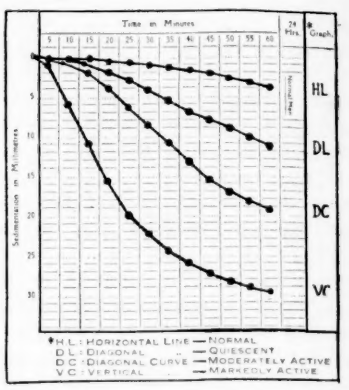

Fig. 7.—The blood sedimentations as registered by the photographs above (Figs. 3, 4, 5, 6) are recorded on the specially printed form, which is a modification of the original Cutler form.

My thanks are due to the Medical Director of Preston Hall for permission to publish this article, to Drs. J. Crawford and A. Ross for their helpful suggestions, and to the original article of H. W. Sulkowitch.[3] The instrument is made by Messrs. A. L. Hawkins and Co., Ltd., of 66, New Cavendish Street, W.1, whose co-operation has made possible the actual production of the sedimentometer.

References

[1] Cutler, J. W.: *Amer. Journ. Med. Sci.*, May, 1932, clxxxiii, 643.
[2] Idem: Ibid., 1926, clxxi, 882.
[3] Sulkowitch: Ibid., 1934, N.S., clxxxvii, 65.

Clinical Memoranda

Angioneurotic Oedema of the Larynx, with Sudden Onset of Asphyxia

The following case seems worthy of placing on record. I think it may prove of interest in view of the fact that a Magill's tube could be passed in such a condition, with the result that the patient's life was undoubtedly saved.

A young man aged 22 walked into the hospital one evening complaining of swelling of the lower part of the face, which had spread from a wheal that appeared spontaneously on the right side of the chin. His voice was husky and feeble, and he had some slight difficulty in breathing. When examined in bed he appeared to be quite comfortable, but was unable to give any useful account of his condition owing to almost complete loss of voice.

The swelling, which involved the whole of the lower jaw, especially the lower lip and to a lesser extent the throat above the level of the thyroid cartilage, was obviously due to oedema. No point of infection could be discovered, so that a diagnosis of angioneurotic oedema was made, and the patient was given four minims of adrenaline subcutaneously.

He appeared to be somewhat better until 9 p.m., when he had a sudden increase in respiratory difficulty. Three minutes later the patient suddenly leaped out of his bed, clutching his throat, and staggered across the ward, to fall asphyxiated into the arms of an attendant. He was then unconscious, black in the face, and almost pulseless.

A Magill's rubber endotracheal tube, lubricated with paraffin, was passed through the right nostril, and fortunately entered the trachea at the first attempt. The patient immediately recommenced breathing through the tube, and in a few minutes was able to walk to his bed, where he remained in comparative comfort until a tracheotomy was done under ideal conditions about an hour later. Adrenaline was given four-hourly, in 4-minim doses, and the swelling subsided in about thirty-six hours. The tracheotomy tube was removed, and the patient has now recovered.

I have since obtained the information that the patient has had two previous, but less severe, attacks—the last six months ago. Immediately before the attack he had eaten some tinned salmon and some loganberry tart—neither of which he is in the habit of taking. There was also a family history of the same condition, which had caused the death by asphyxia of his father's sister.

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St. Albans.

Traumatic Stenosis of the Trachea Treated by Skin Grafting

The following case appears to be worth recording on account of its unusual nature and the satisfactory result of operation.

Case Record

A man aged 41 came to my clinic complaining of severe dyspnoea, and gave the following history. He had been left without any relations when he was 14 years old and at the age of 18 he cut his throat in a fit of depression. After wearing a tracheotomy tube for three years it was removed. He had since then had a slight impairment of breathing, which had gradually become worse during the past eight years, and very much greater during the nine months preceding his coming to hospital. His breathing was then very embarrassed, the slightest exertion causing dyspnoea. When he went up a flight of stairs inspiration was accompanied by a crowing sound, and he had to stop before reaching the top to recover his breath.

There was a large irregular scar over the trachea and an opening through this into the trachea large enough to admit a probe. On examination a definite stricture of the trachea could be seen when looking between his vocal cords, and on passing a tube the trachea was found to be so narrowed that an ordinary pencil would not have passed through the opening. He had flatly refused to wear a tracheotomy tube again. It was hoped to get some idea as to the thickness of the stricture by passing the tube, but this was impossible. Some emphysema and rales were present in the lungs.

Operation Notes

The operation was performed on June 18th, 1936. It is described in detail because the number of recorded cases are few and it may be of use to others who have similar cases to handle. The majority of such cases appear to have been dealt with by using a tracheotomy tube with an additional upward tube which, by continued pressure on the stricture, gradually causes its absorption. The results do not appear to have been very satisfactory in a large number of cases, and the procedure entails a long period during which the tube has to be worn.

The trachea was exposed through a longitudinal incision, the isthmus of the thyroid gland divided and ligatured, and a few drops of 2 per cent. cocaine injected into the trachea. This was then split longitudinally for about one to one and a half inches and held open by an Irwin Moore laryngo-fissure retractor.

The stricture was found to affect the whole circumference of the trachea, to be about a quarter of an inch wide at the base, and narrower at the inner margin, which was rounded. It was composed of dense fibrous tissue.

It was not difficult to dissect away the anterior and lateral parts, but the dissection of the posterior part had to be done with great caution. The posterior wall of the trachea and anterior wall of the oesophagus are extremely thin and easily displaced, and the risk of making a perforation into the oesophagus when cutting away the hard tissue, of which the stricture was composed, had to be constantly remembered and guarded against. A sharp-pointed knife bent on the flat would have been of considerable assistance.

When the stricture was dissected away there was slight but persistent oozing from the raw surface, and this was stopped by gentle pressure with stryphnon gauze. A Tiersch graft was then placed over the raw surface. To keep this in position a rubber finger-stall was packed with small pieces of very soft sponge, introduced into the trachea, and anchored to a tracheotomy tube inserted below.

The pressure was just sufficient to keep the edges of the trachea apart.

After-History

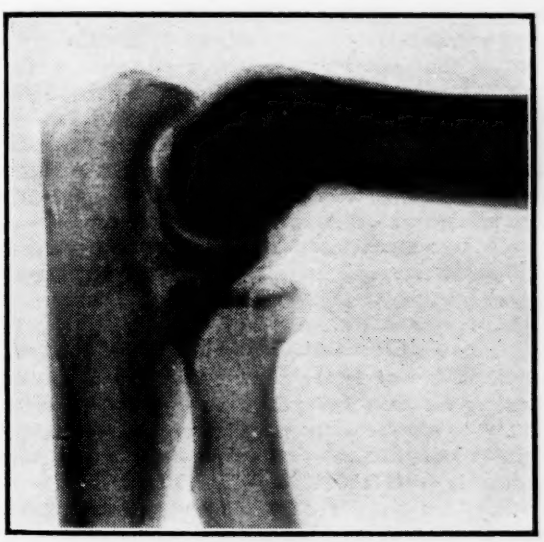
At the end of a week it was found that the graft had taken, so the pack and tracheotomy tube were removed and the wound in the neck closed. A week later the patient went up a flight of stairs two at a time, on which he had had to stop previously, along a corridor, down another staircase, and back to the starting point, where he arrived breathing quietly.

He returned to work some time later, and was in charge of a gang of navvies road building. He is now in charge of a gang of forty-six men doing work of a similar nature. He says his breathing is not so good as that of the other men—he has emphysema—but he is moving about all day in all kinds of weather, and he can handle a pick or spade when necessary.

W. J. Harrison,
Honorary Surgeon, Throat, Nose, and Ear Hospital, Newcastle-on-Tyne.

Fissured Fracture of Head of Radius

I am led to draw attention to the above injury from the fact that it is not uncommon, is frequently missed, and yet can be diagnosed clinically with great accuracy. The history is usually one of a fall on the outstretched hand, the sort of fall which in the female would produce a Colles fracture. There is little or no disability except when trying to extend the arm fully. Almost at the limit of extension there is pain and an inability to extend the



arm quite fully. It is this not quite complete extension which in my experience leads one to suspect the fracture. A careful radiograph will show the fissured fracture of the head of the radius, but, as one might expect, it can be easily missed both clinically and radiographically.

Treatment is simple, consisting of immobilization in a sling at an angle of about 45 degrees, and restoration to full extension is usually complete in about four weeks.

London, N. W. Lees Templeton, M.D.

Reviews

A SYMPOSIUM ON RESPIRATORY DISEASES

For a fortnight each year the New York Academy of Medicine offers to the medical profession by means of lectures and demonstrations "a grasp of the advances in medicine, so that the busy practitioner may be informed from authoritative sources as to the last word on a given topic." In choosing diseases of the respiratory tract for last year's series the Academy's Committee was influenced by the facts that in spite of the great advances in diagnosis, treatment, and prevention these diseases still accounted for more illness and deaths than any other system except the heart and blood vessels, and that within the catalogue of the respiratory diseases were included a wide variety of ailments—notably the common cold and influenza, the pneumonias, pulmonary tuberculosis, and those due to industrially generated dusts.

The various lectures delivered in this course have been collected in a book,[1] which constitutes a "Recent Advances" all the more valuable because each theme is discussed by a foremost authority on the subject. Thus to quote but a few, the common cold is reviewed by A. R. Dochez, bronchoscopy by Chevalier Jackson, the evolution of pulmonary tuberculosis by J. A. Miller, immunity in tuberculosis by Rice Rich, pneumonoconiosis by L. U. Gardner, and chronic non-tuberculous empyema by H. Lilienthal. It is inevitable that among twenty papers written by as many authors differences both in the treatment of the subject and in the literary style should be found. The two extremes are perhaps best illustrated by the dull synopsis style in which diseases of the larynx, trachea, and main bronchi are described and the admirably lucid and interesting chapter on immunity in tuberculosis by Rice Rich, to which we would draw particular attention. A refreshing novelty is introduced by C. T. Porter when he concludes that there is need for the co-operation of the attending physician and the patient with the rhinologist in the successful treatment of sinus disease, and that such co-operation might lead to a change in the prevailing opinion that rhinologists are only interested in operating.

Most of the papers discuss the very latest work and views on the subject in a comprehensive and broad-minded manner, supported by the author's personal experience. In this connexion the paper on diseases of the mediastinum by H. S. Martland may be specially singled out. Several of the authors give useful lists of references. The book is well printed and illustrated, and can be recommended not only to practitioners interested in diseases of the respiratory tract, but to all practising physicians and surgeons.

PUERPERAL GYNAECOLOGY

The case in favour of the view that pregnancy and parturition, so far from being normal physiological processes necessary to the continuance of the species, are pathological states requiring surgical intervention in the majority of cases, is well stated by Dr. Bubis in *Puerperal Gynecology*,[2] a small book in which papers he has published from time to time have been collected. The author is a strong believer in manual dilatation of the perineum, episiotomy, flexing the head, manual dilatation of the cervix, version (Potter), the Scanzoni manœuvre, midforceps, prophylactic forceps, and vaginal Caesarean section. After delivery the birth canal is well inspected, and such operations as tracheolorrhaphy, amputation of cervix, perineorrhaphy, haemorrhoidectomy, and operations for the correction of urethrocele and cystocele performed forthwith.

It must be admitted that the results obtained by the author and his fellow workers would appear to be amazingly good, although the associated morbidity is alarmingly high. The arguments adduced in favour of these procedures is that many women suffer from serious disabilities following childbirth and are not able, for economic reasons, to enter the hospital a second time to have them corrected. It is also maintained that treatment of the cervix after labour will lessen the incidence of carcinoma of the cervix. It must be quite obvious that it is economically impossible to provide a skilled operator to attend and be ready to perform a major operation on every woman who is confined in this or any other country. Apart from the impracticability of the scheme the associated mortality, except in the hands of a few experts, would be appalling. It is impossible to designate these procedures other than as "stunt obstetrics," and it is a matter for conjecture whether the divorce of obstetrics from gynaecology inculcates surgical tendencies in the obstetrician. While not denying the author praise for his surgical skill, we deplore his teaching, and remain of the view that the best results in midwifery are only consistent with the minimum of surgical intervention.

MANAGEMENT OF CHILDREN IN INDIA

We welcome another edition of *Birch's Management and Medical Treatment of Children in India*.[3] This is probably the oldest medical work in constant use to-day. A book which has gone through fourteen editions and retained its popularity for almost a hundred years hardly requires a review. Originally published as *Hints on Children in India*, by Surgeon H. H. Goodeve, in 1844, ninety-two years ago, it supplied a felt want, and met with immediate success, a second edition being required in six months. There is little resemblance, however, between Goodeve's small duodecimo, which would easily slip into the waistcoat pocket, and the large octavo volume into which it has now developed. Goodeve, whose only aid to diagnosis was the old wooden stethoscope, would not recognize the latest edition of the work he originated in the 'forties. The seventh edition was rewritten and edited by the late Surgeon Major E. A. Birch in 1879, and Birch edited three more editions during the following twenty-five years. Goodeve's name has long since been dropped, though Birch's name still remains on the title-page. The present edition is the eighth of Birch's work, the fourteenth of Goodeve's. It is edited by Lieut.-Colonel E. H. Vere Hodge, I.M.S., professor of medicine in Calcutta University, and first physician to the Calcutta Medical College Hospital, who in the introduction acknowledges the help of no fewer than thirteen of his colleagues.

A book of this kind is not so necessary nowadays as it was a century ago, for the introduction first of railways and latterly of the motor car has made it possible to get medical advice more easily than when the most rapid communication depended on the horse. Some excellent general advice is given in the first two chapters. Chapter XXVII, on disease of the nervous system, is headed "For practitioners only," and, indeed, would be beyond the ordinary parent. The work has been brought well up to date. Its general get-up, type, illustrations, etc., are good.

[1] *Diseases of the Respiratory Tract (Eighth Annual Graduate Fortnight of the New York Academy of Medicine).* Twenty-one contributors. Philadelphia and London: W. B. Saunders. 1936. (Pp. 418; 56 figures. 24s.)

[2] *Puerperal Gynecology.* By J. L. Bubis, M.D., F.A.C.S. London: Baillière, Tindall and Cox. 1935. (Pp. 199; 81 figures. 16s.)

[3] *Birch's Management and Medical Treatment of Children in India and the Tropics.* By Lieut.-Colonel E. H. Vere Hodge, M.D., M.R.C.P. Eighth edition. Calcutta: Thacker, Spink and Co. (1933) Ltd.; London: W. Thacker and Co. 1936. (Pp. 377. Rs. 7.8.)

WILLIAM BUDD, PHYSICIAN AND EPIDEMIOLOGIST

Dr. E. W. Goodall has made a useful contribution to the history of British medicine in writing *William Budd*,[4] the biography of a nineteenth century physician and epidemiologist, whose achievements deserve wider recognition. Budd was born at North Tawton, in Devon, in 1811, the sixth of ten children of a country practitioner. Out of nine boys, four of whom won fellowships at Cambridge, six entered the medical profession. William graduated at Edinburgh, after studying in Paris, where midwifery was taught by women and dissection could be inexpensively practised on bodies costing six or seven shillings apiece. After a short period at the Seamen's Hospital, at that time accommodated in the *Dreadnought*, one of the old wooden ships of the line, moored off Greenwich, Budd was appointed to St. Peter's Hospital, Bristol, and became, a few years later, physician to the Infirmary. He devoted himself especially to the prevalence and spread of communicable diseases, and the application of this knowledge to the improvement of the sanitary conditions of the town of Bristol. Ample opportunities were provided by outbreaks of cholera in the city in 1849, 1854, and 1866, with respective mortalities of 1,979, 430, and 29. This progressive decrease may be largely attributed to Budd's efforts towards disinfection of excreta and the provision of a pure water supply. With a view to combating the ravages of cholera in the Crimean War, he tried unsuccessfully to interest the Army medical authorities in his methods.

Budd wrote widely on infectious diseases, frequently contributing to the earlier numbers of the *British Medical Journal*. A man of broad humanity, he showed the deepest sympathy for the sufferings of the poor. He writes of enteric fever: "How often have I seen in past days, in the single, narrow chambers of the day-labourer's cottage, the father in the coffin, the mother in the sick-bed in muttering delirium, and nothing to relieve the desolation of the children, but the devotion of some poor neighbour, who, in many cases, paid the penalty of her kindness in becoming herself the victim of the same disorder." Budd's achievements in the field of epidemiology were recognized by his election as F.R.S. nine years before his death in 1880. One of his sons was the original of the eccentric Cullingworth in Conan Doyle's *Stark Munro Letters*.

SIDE-EFFECTS OF SALVARSAN

Dermatitis and jaundice are two of the greatest bugbears of the syphilologist: these, together with albuminuria and subjective side-effects, have been investigated and reported on by Dr. V. Genner in an admirable monograph, *By-Effects in Salvarsan Therapy and Their Prevention. With Special Reference to the Liver Function.*[5] The incidence of erythema, often going on to dermatitis, has increased parallel with the increase in intensity of salvarsan therapy; it occurs most often during the first or second course of treatment, is usually earlier than jaundice, and tends to recur if salvarsan is resumed. There seems little doubt that the dermatitis is a toxic one, and depends on a cutaneous sensitization; epicutaneous and intracutaneous tests often give positive results. Jaundice also seems to be related to the intensity of the salvarsan therapy, and to appear before the third course of treatment, but more often than not in the rest periods between courses. Its causation has been the subject of much discussion, and three theories have been advanced: that it is due to (1) syphilis of the liver; (2) salvarsan poisoning; and (3) the virus of epidemic infectious jaundice. Genner discusses the different theories and comes to the conclusion that the virus of epidemic jaundice certainly plays a large part in the aetiology of many cases, perhaps by rendering the liver cells unduly susceptible to the toxic action of salvarsan. It is pointed out that albuminuria is seen less often since mercury has been generally superseded by bismuth, whereas arthralgia appeared coincidentally with the adoption of bismuth.

Subjective side-effects such as nitritoid crises, dyspeptic symptoms, lassitude, fever, and headache are also dealt with, and it is pointed out that the use of adrenaline and glucose has a marked effect in eliminating them. The tests of liver function recommended are that for urobilinogen and Hay's test for bile salts so far as out-patients are concerned. With patients treated in hospital Bauer's galactose tolerance test, determination of quinine-resistant lipases, and Meulengracht's method for estimation of the icterus index are also employed. In a final note Genner stresses the need for adopting no general reduction of the intensity of salvarsan therapy, but advises watching for subjective side-effects and employing liver function tests to differentiate those patients who are intolerant of salvarsan; for such patients treatment must be modified. This paper represents a most painstaking study, and should be read carefully by every syphilologist. The translator has not been too happy in his choice of words, but at least he has succeeded in conveying the author's meaning, in spite of numerous minor errors and coined words.

GYNAECOLOGICAL AND OBSTETRICAL TUBERCULOSIS

The Trudeau Foundation at Saranac Lake has played an important part for many years in the study of tuberculosis. It presents in *Gynecological and Obstetrical Tuberculosis*, by Edwin M. Jameson,[6] a monograph which should attract the attention not only of gynaecologists and obstetricians but also of all practising phthisiologists. The scope of the book is comprehensive. In little over 200 pages are discussed on the basis chiefly of personal experience: (1) the changes in the pathological physiology of the female genital system brought about by pulmonary tuberculosis; (2) the various forms of female genital tuberculosis; and (3) the problem of pregnancy in the tuberculous woman, "with suggestions for the management of the various types of cases in the light of modern phthisiology." In the first section it is of practical interest to note the relation of menstruation to artificial pneumothorax: the author advises, as do some workers in France, not to carry out refills during the menstrual periods, because this tends to increase the frequency of complicating pleural effusions. The second section is the longest of the three and contains detailed descriptions of pathology and a well-reasoned assessment of the various modes of treatment.

In the short section on tuberculosis and pregnancy—a subject discussed by Professors James Young and Henry Cohen in papers published last week—the views of numerous authors who consider that pregnancy aggravates phthisis and of those who hold the opposite view are critically examined. Dr. Freeman states that "it is an ironical commentary on our modern civilization that a people who are so generous in providing for the welfare of the ordinary phthisical patient have thus far made only sporadic and totally inadequate attempts to meet the special requirements of the gravida who is suffering from pulmonary tuberculosis." (Unfortunately this applies also to this country.) He remarks that on the whole French and, more recently, German clinicians

[4] *William Budd*. By E. W. Goodall, O.B.E., M.D. Bristol: J. W. Arrowsmith (London) Ltd. 1936. (Pp. 159; illustrated. 5s. net.)

[5] *By-Effects in Salvarsan Therapy and Their Prevention. With Special Reference to the Liver Function*. By V. Genner, M.D. Copenhagen: Levin and Munksgaard. 1936. (Pp. 360; 22 crowns.)

[6] *Gynecological and Obstetrical Tuberculosis*. By Edwin M. Jameson, B.S., M.D. London: Baillière, Tindall and Cox. (Pp. 256; 31 figures. 16s.)

favour conservation of the pregnancy, while the majority of the American and British advise intervention. He believes that to a large extent change in views is due to our improved methods of treating pulmonary tuberculosis, and that to obtain a true picture of the problem it is necessary to make a fresh start on the basis of these modern methods, every case to be considered individually. A list of over 1,000 references is a valuable feature of the book.

AETIOLOGY AND PROPHYLAXIS OF WAR

In *Footsteps of Warfare*[7] Dr. R. L. Worrall traces the origin and development of war, finding from earliest times ample support for his thesis that war is not an evil necessity of human nature, but the definite outcome of the defects inherent in the capitalist system. War was unknown in the period of the primitive communism of the Stone Age, when possessions were scanty and men subsisted on the fruits of the chase. Those peoples, such as the Eskimos, the natives of Tierra del Fuego, the bushmen of the Kalahari Desert, and the pygmies of the Congo, who have retained this primitive communism, remain as peaceful as their remote ancestors. Elsewhere, however, hunting was gradually replaced by agriculture, and more stable conditions led to the amassing of private wealth and the formation of a primitive aristocracy, followed by the establishment of trade and the relegation of the majority to a state of serfdom. Conditions were now favourable for war, of which our first record dates from the times of the early Pharaohs. Populations increased faster than methods of food production improved ; this led to a competitive struggle for land.

Dr. Worrall maintains that the wars of the Roman Empire were fought for trade, plunder, tribute, and slaves, and that the Crusades, under the veneer of religious propaganda, were dominated by territorial and commercial interests. Passing on to modern times he describes imperialist war as " an integral part of capitalism in the twentieth century," the climax of the economic rivalry of great industrial monopolies. Then follows the sordid tale of the struggle for control over sources of raw materials, intensified by the enormously increased importance of oil, and it is stated that in the recent war between Bolivia and Paraguay those countries were the pawns of conflicting British and American interests in the Bolivian tin deposits.

Although he regards present conditions with justifiable cynicism, Dr. Worrall expresses an optimistic confidence in the future abolition of war. His remedy is socialism. " The end of capitalism means the end of war. With no scarcity of the means of life and no struggle for individual profit there is no basis for warfare." This unpretentious book shows evidence of wide reading, deep thought, and absolute sincerity on the part of the author, who has marshalled his facts and deductions with ability and skill. It is a book that will make men think.

Notes on Books

We have received the first two issues of *Enzymologia*, a journal of physiology and biochemistry published at the Hague under the editorship of Professor Carl Oppenheimer of Berlin, supported by an international group of collaborators in which this country is represented by Sir F. Gowland Hopkins, Drs. M. Dixon and D. Keilin of Cambridge, H. A. Krebs of Sheffield, and I. H. Quashtel of Cardiff. The articles are written in English, French, or German. The price of a volume of 400 pages is 15 Dutch florins.

[7] *Footsteps of Warfare. A Study of the Origin and Development of War.* By R. L. Worrall, M.B., Ch.M. London: Peter Davies Ltd. 1936. (Pp. 236. 7s. 6d. net.)

Mr. J. E. R. McDonagh has produced this year a volume under the heading *The Common Cold and Influenza and their Relationship to other Infections in Man and Animals.* It is described in the subtitle as " The Nature of Disease Annual Reports for the Years 1934 and 1935," and is published by William Heinemann (Medical Books) Ltd., price 12s. 6d. In an introductory chapter the author gives his reasons for recording this stage of the work in book form. " We would have preferred to have kept to our original plan, but our experience with the journal has shown us that the profession is not prepared to give any heed to the advantages the substitution of correlation for differentiation would have. Whether our change of plan is justified or not, we deem it of the utmost importance not to break the continuity of the work being done on infections, because it throws light upon the subacute and chronic manifestations of disease as well as upon the acute ; indeed, it connects them all, and assists materially in establishing our conception of the unity of disease." The volume is divided into clinical and bacteriological sections, and the annual report for 1935.

The work on *Social Hygiene*[8] by Mr. Henry Ernest Garle, barrister-at-law, is divided into two parts, the first dealing with the various problems connected with prostitution, including venereal disease, and the second containing a digest of the laws in various countries relating to these two subjects, followed by appendices concerned with the traffic in women and children, and a bibliography of almost exclusively English literature classified according to anthropology, biology and physiology, psychology, and social applications.

In a book entitled *Comparative Inorganic Chemistry*[9] Mr. T. H. Savory has attempted a task of some magnitude and difficulty. The subject contemplates an aspect of chemistry which has long exercised the mind of every serious student of the science, for it is essentially the resemblances and the differences of comparable elements and compounds that engage his attention at every turn. The treatment of comparative inorganic chemistry ought accordingly to be focused on the properties which admit of simple comparison. This book, however, offers no striking presentation of facts in this form, and differs but little from an ordinary book of rudimentary inorganic chemistry.

The *Empire Social Hygiene Yearbook* for 1936 (London, George Allen and Unwin Ltd., p. 700, 15s. net.), which has been prepared by the British Social Hygiene Council, Carteret House, Carteret Street, S.W.1, follows the lines of its two predecessors and contains vital statistics relating to infant welfare, the incidence of venereal diseases, health education, prostitution, and the teaching of biology. It is designed to assist workers in the fields of health education and social service particularly, but is of much general interest, and is a useful reference book. The new edition includes sections on broadcasting and films and the training of women in Empire citizenship, a note about the work of the Health Section of the League of Nations, a section reviewing labour conditions in oversea territories, and more detailed information about health, social services, and venereal diseases. A generalized description of the state of biological teaching in schools in the country generally has been added, and a survey of the social hygiene position in Australia is contributed by the Director-General of Health for the Commonwealth. Statistics relate for the most part to the year 1934. Articles have been written for the new edition on medical and social subjects such as yaws and syphilis, the modern treatment of venereal diseases, the task of the social worker in the V.D. clinic, the youth movement and the teaching of positive health, recent developments in the teaching of biology in secondary schools for boys, and science teaching in girls' schools.

[8] *Social Hygiene To-day.* By Henry Ernest Garle of the Middle Temple, Barrister-at-Law. 1936. London: George Allen and Unwin Ltd. Pp. 387. 12s. 6d. net.)

[9] *Comparative Inorganic Chemistry.* By Theodore H. Savory, M.A. London: E. Arnold and Co. 1936. (Pp. 160. 4s.)

PUBLIC HEALTH IN THE UNITED STATES OF AMERICA*

V.—SOCIAL SECURITY

BY

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In the post-war years when European peoples, and especially our own nation, were faced with deteriorating economic conditions but America was enjoying exceptional prosperity, many observers in the New World looked askance at what appeared to them to be the demoralizing effect of social legislation of this country. The criticism of certain of our own publicists, that the growing burden of the social services at a time when our trade balance was disappearing was a manifestation of the recklessness of approaching bankruptcy, was widely accepted as valid. It would probably be true to say that this opinion was not shared without qualification by all serious American students of world social and economic conditions, but the possibility of the occasion arising for such provision on a similar scale in their country must have seemed remote. The American outlook seems to have undergone a rapid change since the slump of 1929. That the new outlook did not originate with the advent of the Roosevelt administration is shown by the fact that President Hoover appointed a Research Committee on Social Trends as far back as December, 1929. Most of the existing or prospective social legislation, however, appears to be modelled upon the recommendations of a Committee on Economic Security appointed by President Roosevelt in 1934. This committee has carried out exhaustive investigations into the economic and social conditions of the American people, both in times of prosperity and of distress. Here it is possible only to refer very briefly to some of the steps which have been or are being taken to give effect to its suggestions.

The New Deal

It is a matter of common knowledge that a vast emergency organization was set up by the President to cope with the acute problems of the economic crisis, embodying the projects comprehensively described as the New Deal. It is hard for an outsider to follow its ramifications or to identify each of its parts by its literal nomenclature. It may be sufficient for our purposes to mention that the Federal Emergency Relief Administration (F.E.R.A.), the Civilian Conservation Corps (C.C.C.), and other bodies not primarily set up with any medical object, have been faced with the need for medical assistance of one kind or another, adding to the general appreciation of the disabilities suffered by a community without organized medical and social services. The Tennessee Valley Authority (T.V.A.), whose work of soil conservation and economic restoration was mentioned in the second of these articles, not only co-operates with and assists the existing State and local services, but has also had to establish quite a large organization for clinic and hospital treatment on its own initiative.

The Social Security Act

The greatest interest attaches to the proposals of a permanent character contained in the Social Security Act, 1935, involving as they do extensive departures from tradition both in the relations of Federal, State, and Local Government bodies, and also in the responsibilities of these bodies to the people. It must be understood that America has its Poor Law system akin to our own, if anything more unpopular with its beneficiaries. Some indication has also been given in the third of these articles as to the developments in modern State medicine in the U.S.A. parallel to ours. Nearly all the States have Workmen's Compensation Acts, but until now there has been much less governmental provision for insurance against poverty from unemployment, ill-health, widowhood, orphanhood, or old age than in most European States. The Social Security Act is designed to fill some of these gaps, and to strengthen and knit together the whole public health organization of the country.

The subject-matter of the Act may be summarized under nine main headings, with brief notes on some of them and mention of the funds appropriated to the Federal Government in the financial year ended last June for each purpose.

1. *Cripples.*—Provision through States and local authorities for ascertainment, education, and treatment of cripples on the lines established in New York State since 1916 and similar to the system in this country: **$2,850,000.**†

2. *Destitute Children.*—Dependent children without proper care in their own homes requiring to be looked after by States and local authorities: **$1,500,000.**

3. *Vocational Rehabilitation.*—The restoration of working capacity among the disabled: **$1,900,000.**

4. *Care of the Blind.*—Financial assistance of individual blind persons through States: **$3,000,000.**

5. *Widows' Pensions.*—To assist States in establishing funds for pensions for widows apart from the Poor Law. Such provision has been legal for twenty years, but the power has not been uniformly exercised: **$24,750,000.**

6. *Non-contributory Provision for Old Age.*—Some States already make such provision apart from the Poor Law. States may decide the age for qualification up to 70 years until 1940, when a uniform age of 65 years will come into effect. Annual appropriations are expected to increase as the result of the ageing of the population. Present appropriation: **$49,750,000.**

7. *Public Health.*—(*vid. inf.*) **$10,000,000.**

8. *Child Welfare.*—For protection of mothers and infants, to be administered by the Children's Bureau of the Federal Government through States and local authorities: **$3,800,000.**

9. *Old Age Contributory Pensions and Unemployment Insurance.*—This is an entirely new departure. Federal levy on pay-rolls from both employers and employed. For old age pensions the levy will amount at the beginning (1937) to 1 per cent. of the wage-bill from employers and an equal amount from employees, rising to 3 per cent. in 1948. Administration to be entirely Federal. There appears to be some doubt as to the legality of this provision under the Constitution. Unemployment insurance, on the other hand, is intended to be administered through the States under their own laws. Contributions for this purpose will be levied from employers by the Federal Government at the rate of 1 per cent. of the wage-bill rising to 3 per cent. in 1938, but if an employer pays into an approved State unemployment insurance fund he is to be exempt from Federal tax up to 90 per cent. of the amount of his State contributions. Appropriation for assisting State unemployment insurance schemes: **$49,000,000.**

It will be seen that a very substantial sum of nearly 150 million dollars per annum has already been provided by Congress for the purpose of the Social Security Act, mostly for the subvention of States and local authorities. When it is remembered that national grants for the social services have been comparatively unimportant in the past the almost revolutionary character of this change in American policy will be realized. It should also be observed that a change of party majority in the Federal representative bodies might sterilize the Act by withholding money required for its administration, so that its full enforcement may depend upon the result of the elections in November.

* This is the fifth of a short series of articles on public health in the U.S.A. contributed by invitation.

† The present value of the dollar may be taken as approximately equivalent to 4s. sterling.

Public Health Provisions

Space will not permit of an account of the working of most of these schemes or the various central departments, old and new, responsible for the administration of the grants. The public health provision, however, may be dealt with a little more fully, as it is not only of special interest to medical readers but also illustrative of the method generally followed by the Central Government. The Public Health Title of the Act authorizes:

"1. An annual appropriation of not to exceed 8,000,000 dollars for the purpose of assisting States, counties and health districts, and other political subdivisions of the States in the establishment and maintenance of adequate health services, including the training of personnel for State and local health work.

"2. An annual appropriation of not to exceed 2,000,000 dollars to the Public Health Service for research activities of the Service and for the expense of co-operation with the States in the administration of the Federal funds to be granted for aid in the establishment and maintenance of State and local health services."

It therefore contemplates a substantial increase in the personnel, equipment, and activity, both of the central, of the State, and of local departments. The Public Health Service, with its long tradition and experience, can safely be left to expend its 2,000,000 dollars to the best public advantage, but subsidy of States and local authorities must be conditional. The conditions are laid down in Regulations of July 3rd, 1936, made by Surgeon-General Parran of the Public Health Service, after consultation with the Conference of State and Territorial Health Authorities, and approved by the Secretary of the Treasury. It should be noted that the Public Health Service deals only with the States, the latter being responsible for the internal distribution of the allotments.

Grant Regulations

Under the regulations funds will be allotted to the States on the basis of (1) population, (2) special health problems, and (3) financial need. Of the available moneys 57½ per cent. will be distributed strictly in proportion to population; 22½ per cent. according to the incidence of special health problems, including the training of personnel, as determined by the Surgeon-General; and 20 per cent. on the basis of financial need. The payments must not be used to relieve State or local authorities of existing expenditure. Half the grants based on population and special problems (but not including those for training of personnel) must be matched by at least an equivalent existing appropriation, and half by new appropriations for public health purposes. These conditions are subject to modification in certain circumstances. The special health problems are such as may arise from inequality of exposure to hazard—for example, malaria, hookworm, plague, trachoma, typhus, or occupational disease.

Submission of Plans and Budgets

Each State is required to present a comprehensive statement of the present State organization, programmes, and budget, a proposed plan for extending and improving the administrative functions of its department of health, and a proposed plan for extending and improving local health services with the assistance of the funds now available. Before payments are made the State Health Officer must submit for approval to the Surgeon-General a proposed budget, showing the sources, purposes, and amounts of all funds and the amounts requested from the Public Health Service for each project. Quarterly financial and progress reports are also required.

Training of Personnel

An amount of 1,001,186 dollars of the total appropriation is specifically set aside for enabling States to train officers for the State and local health services. Of this sum 888,186 dollars will be distributed to States in proportion to their other allotments, while the remaining 113,000 dollars will be distributed on the basis of special need for training of personnel. These moneys are to be used to pay living stipends, tuition, and travelling expenses for persons employed, or to be employed, in the services, the training period not to exceed one year. The intention is to use existing training centres or to foster new public health training centres at existing institutions. It is specially important to note that this provision is not merely directed to the development of refresher courses, but is principally a Government grant toward the education of entrants to the public health service, medical and otherwise.

Health Insurance

The absence of provision for health insurance in the Social Security Act will have been noticed. This is not due to lack of interest in the subject. A comprehensive report has been prepared by the staff of the Committee on Economic Security outlining a scheme of insurance which would extend to much higher wage levels than in this country, include dependants, and provide specialist services, hospital, clinic, and laboratory services, minimum dental care, and home nursing. Emphasis is laid on separation of the administration of medical from financial benefits and on certification for the latter by whole-time medical officers. Space will not permit of a detailed discussion of this interesting project, and it may be well to await the appearance of a further report, which is understood to have been completed. Corporate medical opinion in America appears to be suspicious of insurance practice, and there is some misapprehension as to the views of organized medicine in this country on the subject. It would be unfortunate if any such misunderstanding should prove an obstacle to the introduction of a scheme of health insurance in America.

AIR RAID PRECAUTIONS

THE PROBLEM OF GAS DEFENCE

The earlier publications of the Air Raid Precautions Department have been noticed in this *Journal* (August 3rd, 1935, p. 242; September 7th, 1935, p. 468). We have now received further literature which shows that this Department of the Home Office is expanding and systematizing its publications. A leaflet entitled "Air Raid Precautions: Summary of Position," No. 1, explains that the Department is collaborating with local authorities in the preparation of local schemes for protection, and is publishing a series of memoranda in support of this work. Three such memoranda have been published: "Organization of Air Raid Casualties Services"; "Rescue Parties and Clearance of Debris"; and "Organization of Decontamination Services." The Department is also publishing a series of handbooks intended for a wider public. Three of these, *Personal Protection against Gas*, *First Aid for Gas Casualties*, and *Decontamination of Materials*, have already appeared, and another, a clinical textbook for doctors and nurses entitled *Medical Treatment of Gas Casualties*, is in preparation. These memoranda and handbooks have been carefully written and give sound advice. As an example of the advice given the first two recommendations of the handbook on personal protection may be quoted:

"(1) Immediately on hearing an air-raid warning take cover in a gas-protected room or shelter unless your public duty

compels you to go out of doors or remain at work in an unprotected place. (2) Be sure you have your respirator handy in your room or shelter."

We have also received a small pamphlet entitled, "Gas Attacks, Is there any Protection?" which has been prepared by the Socialist Medical Association. This pamphlet is perhaps unduly pessimistic and critical, but many of the problems to which it draws attention appear to be both obvious and awkward. For example, it asks such questions as "How can that section of the population in which a family lives in one or two rooms give up a room for gas defence?" and "How can the poorer sections of the population afford a tolerably efficient respirator?" Similarly, the pamphlet points out that while mustard gas contamination can be removed by chlorinated lime, yet the amount needed for one street a mile long and twenty yards wide is 1,760 tons. We do not know if these calculations are correct, but the real problem in decontamination is clearly the quantitative one of the supply of chlorinated lime in amounts that are in any way adequate.

We notice that representatives of the Home Office are complaining that the medical profession knows nothing about the prevention and treatment of gas casualties. In actual fact, a certain section of the profession has had fairly extensive practical experience of this problem, but it is possible that these medical men are saying very little because they fear that their opinions would be unpopular. For example, the official publication is correct in pointing out that the first essentials in protection against poison gas are the possession of an efficient respirator, its immediate use, and its continued use as long as there is any danger. Everyone with war experience knows, however, the extraordinary difficulty in enforcing these simple rules. During the war the population involved was one of men under military discipline, most of whom had had experience of gas and had seen the dire consequences of neglect of protective measures.

The essential problem in gas defence is the education of the public, and the difficulty of this task can be gauged from the facts mentioned above. Perusal of the publications of the Air Raid Precautions Department (all issued at small cost by H.M. Stationery Office) suggests that the authorities are trying to work out a scheme of defence without alarming the public. This is a very natural endeavour, but it will make no strong appeal to those who have had experience of gas warfare.

Nova et Vetera

JOHN HUNTER'S REMAINS

The Removal from St. Martin's to the Abbey

Newspaper references to the vaults under the church of St. Martin-in-the-Fields, Trafalgar Square, have prompted Mr. J. B. Firth to recall in the *Daily Telegraph* the search by Frank Buckland for the coffin of John Hunter, and its reinterment in Westminster Abbey seventy-seven years ago.

John Hunter died on October 16th, 1793, at St. George's Hospital. The body was privately buried under St. Martin's Church, where it remained undisturbed until January, 1859. Dr. F. Dawtrey Drewitt, in his *Life of Edward Jenner* (second edition, 1933, p. 27), gives a brief account of the circumstances, with a footnote reference to Buckland's own narrative (*Curiosities of Natural History*, third series, vol. ii, p. 159: London, Richard Bentley, 1866). The full story is headed "Discovery of the Remains of John Hunter in the Vaults of St. Martin-in-the-Fields."

Frank Buckland's Pious Task

In January, 1859, Buckland, at that time assistant surgeon to the regiment, was "sitting in the mess-room of the 2nd Life Guards, at Windsor, carelessly looking over the advertisement sheet of the *Times*," when he saw a notice that all coffins in the vaults under St. Martin's would be reinterred in catacombs in the churchyard, and finally built and closed up unless removed by February 1st. Buckland was already becoming known as a naturalist and writer on natural history. He had been house-surgeon at St. George's and was an enthusiastic admirer of Hunter and his works.

"Why, surely John Hunter is buried in this church, was the thought that immediately struck my mind: his remains ought surely to be looked after, but who is to do it? I will try to rescue his remains. If I fail there will be no harm done. My leave of absence from my regimental duties happening to occur most opportunely at this time, I hastened to London, and the next morning found me in the portico of St. Martin's Church inquiring for the sexton."

Search at length brought him to the right item in the old register of burials, and this identified the vault. Buckland then sought the aid of Mr. R. K. Burstall, the vestry surveyor of St. Martin's, who set his men to work immediately at No. 3 vault and throughout the search gave unstinted help.

"When we threw the light of our lanterns into the vault (for our work was mostly done by lamp-light) I beheld a sight I shall never forget. The vault was a good-sized room, as full as it could hold with coffins piled one over the other from the very top to the very bottom, and placed in all possible directions, reminding one much of books packed in a box to be sent away. Many coffins were piled up crossways in front of the door, so that no entry could be obtained except by moving them. To the left of this vault there began another vault, in which there were a great quantity of simple wooden coffins of persons buried anterior to the Act which ordered that no person should be buried except in lead. The faint and sickly effluvia which emanated from this vault were truly overpowering and poisonous. I did not feel the effects of this till my work was over, and the excitement passed off. I was then exceedingly unwell for more than a fortnight, and from the peculiar symptoms was frightened about myself; but, thanks to a kind Providence, I quite recovered my usual health after a time. Mr. Burstall tells me that he also suffered, and that he was obliged, soon after he had finished his work, to leave London for four months."

For fifteen days Buckland and Burstall laboured in the dismal and malodorous vault examining by the light of a lantern each metal plate as the coffins were brought out on their way to the catacombs. The number of coffins in No. 3 vault was over 200, and not till the last two lay side by side upon the floor did the search come to an end (the total number removed from underneath the church was 3,260). To his intense delight Buckland read upon the brass plate of one of the two remaining coffins in a corner of the vault:

JOHN HUNTER
Esq.,
Died 16th Octr.,
1793,
Aged 64 Years.

The coffin was put aside, and after many difficulties had been overcome by the Royal College of Surgeons and by Buckland it was solemnly reinterred in Westminster Abbey on March 28th, 1859, on the north side of the nave, between Wilkie and Ben Jonson. Buckland adds that his exertions were rewarded five months later by a silver medal from the council of the Leeds School of Medicine and in December, 1864, by a gift of handsomely bound books from the College of Surgeons and a copy of a resolution by the College Council thanking him "for his active and efficient services in identifying the body of John Hunter." In a letter of grateful acknowledgement he wrote: "From my earliest childhood I was brought up by my late respected father, the Dean of Westminster, to regard the memory of John Hunter with a respect almost approaching to veneration."

Mr. Firth will be voicing the opinion of many members of the medical profession when he suggests that so noble an act of self-devotion should be honoured by a tablet briefly recording the facts on the wall of St. Martin's vault at the time of its transformation to the service of the living. If the vicar of St. Martin's, the Rev. Pat McCormick, took steps to commemorate Frank Buckland's pious act, in the neighbourhood of the vault, he would surely attract subscriptions from medical men and women.

British Medical Journal

SATURDAY, OCTOBER 24th, 1936

SMALL-POX IN LONDON

Although there has been no small-pox in London since 1934 there is constant risk of invasion in view of the present state of the community in regard to vaccination. It is probable that less than one-half of the population under 10 years of age is immune to small-pox, and that among older subjects the proportion is much lower. In the last ten-year period England and Wales has experienced a visitation of both severe and mild forms of small-pox, particularly of the latter. Although there are earlier records of variations in the severity of small-pox, the mild form as a predominating type appears to have originated in the Southern States of the U.S.A. in 1895. It was introduced into England in 1901, at a time when the severe form was prevalent, but failed to establish itself. From 1921 to 1934 it reappeared in epidemic form, reaching the maximum in the year 1927, when 14,767 cases were notified in England and Wales.

In a report just published by the London County Council[1] are described the clinical aspects of the last small-pox epidemic in London, which lasted for a period of over six years, from 1928 to 1934. The author, Dr. J. Pickford Marsden, who had the unique opportunity of observing personally nearly all the patients, has marshalled the complex clinical and immunological data relating to 13,686 cases within the compass of twenty-three pages, with commendable clarity. The review is limited to cases of variola minor, which was the prevailing type at the time. The author accepts without question the teaching of Ricketts that the mild form of small-pox should be regarded as " modified " in contradistinction to the " natural " or " unmodified " grave form. Modification may be due to degradation of the causative organism, or to the relative immunity of the host, or to a combination of both factors ; it may be impossible to determine in a given instance which factor is operative without regard to the general epidemiological features of the disease. It is agreed that, in general, variola minor in epidemic form breeds true, irrespective of the immunological state of the community. A detailed analysis is made of the clinical features of the 13,686 cases under observation ; of the total number of patients thirty-four died, approximately 1 in 400. Only a minority succumbed as a direct result of small-pox toxaemia ; in eleven patients death was ascribed to complications or associated conditions ; in three small-pox was a definite contributory, and in fifteen merely a remote contributory, factor in determining the fatal issue, while only in five patients, whose ages ranged from 2 days to 3 weeks, was small-pox the sole cause of death. Information on the initial phases of the disease was somewhat scanty, as only 0.83 per cent. of all cases were admitted in the pre-eruptive stage. It was therefore necessary to rely on the history furnished by the patient, and in 8.51 per cent. of cases no history of any symptoms prior to the onset of the rash could be elicited. The data relating to the remainder did not indicate that the initial stage is prolonged in variola minor compared with the graver disease, the rash occurring in more than half the cases on the third or fourth day, while the duration of the primary fever was commonly three, four, or five days. The distribution of the rash, whether so sparse as to amount to less than a dozen lesions, or so profuse as to be confluent on the face, closely simulating the major disease, conformed to the centrifugal pattern characteristic of small-pox. The only constant feature differentiating the rash from that of variola major was the accelerated rate at which the individual lesions passed through the different stages, although actual suppression or arrest of development of any particular stage was not observed ; the papular stage lasted on the average but two days, vesicles less than twenty-four hours, and pustules three, or at most four, days, the lesions reaching their height on the fifth or sixth day.

The frequency of ocular complications and the emergence of encephalitis in association with small-pox are worthy of particular note, although but brief reference is made to the latter complication. Amongst the 13,686 cases seven definite cases of encephalomyelitis were observed, three proving fatal. In twelve other cases drowsiness and unexplained pyrexia were noted at a stage when nervous complications most commonly occur and were in all probability instances of mild or abortive encephalitis. Precise records are given of the effect of small-pox on pregnancy ; six abortions were met with, three in hospital at the third and fourth months, and three before admission at the fourth and sixth months. Delivery of sixteen pregnant women resulted in sixteen live infants (twins in one case), and one stillborn foetus with a papulo-vesicular eruption. Twenty-seven women were confined before admission in the initial stage of small-pox. Amongst the forty-three patients there was no instance of puerperal sepsis, although several had a profuse pustular rash at the time of delivery. It appears that the foetus is usually infected in the pre-eruptive stage of the disease in the mother ; if infection does not take place at this stage it is likely to occur at the time of delivery, especially if the rash is recent. Failing congenital infection the child is born completely susceptible, and will contract the disease after the normal incubation period unless protected by vaccination. If the foetus is neither infected nor expelled it will acquire a natural but temporary immunity from the mother.

Important observations are recorded on the protection conferred by vaccination ; 1,756 of the cases under

[1] London County Council. A Critical Review of 13,686 Cases of Small-pox (Variola Minor). P. S. King and Son Ltd., 14, Great Smith Street, S.W.1. No. 3209. (6d.)

review showed evidence of vaccination at some time previously, and twenty-five had been successfully re-vaccinated. As successful vaccination always results in a permanent scar, only cases with evident scars were included. Examination of the figures gives no support for the view that the protection conferred by vaccination is less effective against variola minor than against ordinary small-pox. Of the total number of cases only seven showed evidence of vaccination in the previous ten years, while no member of the staff of the small-pox hospitals contracted the disease. Attack followed successful vaccination performed on 1,083 patients during the incubation period ; in the majority of these the rash appeared on the ninth or tenth day after the operation, while in six instances the rash appeared after an interval of thirteen days or more following successful vaccination. These exceptional cases, which appear to contradict the accepted teaching of Ricketts that vaccination carried out on the seventh day after contact confers immunity, are probably attributable to delay in the vaccination reaction, with consequent delay in immunity response. Less than half of the vaccinations carried out on the first day of the rash were successful ; by the fifth day the number was reduced to 1.5 per cent., and on the seventh and subsequent days all attempts to evoke a vaccination response were unsuccessful. The findings indicate that the immunity against vaccinia which follows a clinical attack of variola minor is solid, differing in no material respect from that conferred by variola major, thereby confirming its value as a diagnostic aid in doubtful cases. Reference is made to the value of vaccinia-variola flocculation reaction in diagnosis, but no details are given of any cases in respect of which the test was applied.

A world-wide survey of the distribution of the two types of small-pox and their epidemiological and immunological significance has been made in a recent American publication.[2] It is shown that during recent decades mild small-pox with a case fatality of less than 1 per cent. has been the prevailing type in certain English-speaking countries, such as U.S.A., Canada, and England, while the severe form with fatality rates of 25 to 30 per cent. is the predominating type in India, Central Europe, and China. The two diseases appear to be due to two distinct strains, and retain their distinctive characters under varying environmental conditions ; if intermediate strains exist they fail to establish themselves sufficiently to acquire epidemiological significance. The explanation offered for the apparent greater dispersibility of the milder disease is that in highly organized communities variola major is immediately circumscribed by a barrier of immunes by means of selective vaccination and isolation or supervision of contacts, while the benign form evokes less energetic action. The termination of the recent London epidemic cannot be ascribed to exhaustion of non-immunes: the possibility of changes in the vitality and infectivity of the organism merits consideration.

[2] U.S.A. Public Health Reports. Washington, April 3rd, 1936.

MEDICAL CORONERS

Some months ago[1] we endeavoured to show that the Departmental Committee's Report on Coroners[2] was unnecessarily severe on medical coroners. The first practical effect of the Departmental Committee's attitude towards medical coroners appeared in a resolution of the Public Control Committee of the London County Council: "Having regard to the recommendation of the Departmental Committee that in future only solicitors or barristers be appointed coroners, the Committee propose to discontinue the requirement of a dual qualification in relation to future appointments." It has been the practice of the Public Control Committee since 1919 to require of candidates for the position of coroner both a legal and a medical qualification. Such a change in policy at the present time and for the reason given must be regarded as a definite move to exclude registered medical practitioners from participation in this very important work, and if that is the intention of the London County Council it would pave the way for other local authorities to follow the L.C.C.'s example as they have done in the past, and, in fact, prejudice the question when the recommendations of the Departmental Committee come before Parliament for consideration.

The British Medical Association has since been afforded an opportunity by deputation of putting its views on the matter before the Public Control Committee. These are embodied in a memorandum published in our *Supplement* to-day. Before preparing the memorandum the secretary of the Departmental Committee was asked to place the Association in possession of the evidence which led the Committee to arrive at Recommendation No. 26: "In future only solicitors or barristers should be appointed as coroners, but, whenever possible, they should have had experience as deputy coroners and should have a knowledge of forensic medicine." He replied that the Committee had decided that beyond the summary of the evidence set out in the course of the report no disclosures should be given of the evidence taken before it. He added that many people talked quite confidentially to the Committee, and it would have been a matter of great difficulty to sort out the evidence which could be made public from the evidence which would have to be suppressed. Further, on grounds of expense it was not usual for a Departmental Committee to publish the evidence. It may be true that some of the evidence given was of such a nature bearing on the work of coroners generally that it is inadvisable to publish it, although the evidence given to the Departmental Committee on Coroners of 1908 was published in full. If there was evidence of such a nature as to lead the recent Committee to reject the services of medical men in the future for the position of coroner, the reasons offered for withholding this information are not convincing, nor does the body of the report give adequate grounds for such a recommendation.

[1] *British Medical Journal*, March 14th, 1936, p. 537.
[2] Ibid., February 15th, 1936, p. 321.

The point we wish to make is that no public criticism has been directed against the doubly qualified medical coroner as distinct from the legal coroner. The evidence which led the Departmental Committee to make this damaging discrimination must be known in order that the impression left in the minds of its members and conveyed to the public by the report can be removed. It is unreasonable that the bald finding of a committee, largely legal in its membership, should be accepted either by the public or by Parliament without full information. The first questions that arise and demand an answer are: Were the witnesses who gave adverse evidence entirely disinterested? and Were they persons possessed of such wide experience in the duties of coroners that their opinions must be accepted without challenge? We understand that the Committee heard no evidence on the point from such responsible and recognized sources as the Coroners' Society itself (Mr. Mowll, a member of the Committee, did not represent the considered views of the Coroners' Society), individual medical coroners, coroners doubly qualified, or the British Medical Association or the Society of Medical Officers of Health—in fact, the medical coroner was never given an opportunity to defend himself before the Committee. It is to be hoped that the London County Council will do nothing to prejudice medical men for the position of coroner until Parliament has had an opportunity of considering the Departmental Committee's report in all its aspects.

ARTIFICIAL PNEUMOTHORAX FOR LOBAR PNEUMONIA

The value of any new method in the treatment of lobar pneumonia must be considered in the light of two facts: first, the period of the disease is fixed ; and, secondly, no specific form of treatment has hitherto produced any dramatic results in shortening this. Artificial pneumothorax, like other forms of treatment, must be judged according to whether it helps or hinders the recovery which will naturally occur in a large percentage of cases. There are two possible reasons for employing pneumothorax in pneumonia—either to compress and immobilize the lung, or to separate the two layers of the pleura. The former might theoretically have the effect of reducing the degree of toxaemia and even of shortening the disease process ; the second can only remove those symptoms which are directly due to pleural irritation. Since the report of Friedmann in 1921 an extensive literature on the subject has appeared. Articles published before November, 1935, have been summarized by Blake, Howard, and Hull.[1] In the first part of their paper an analysis is given of 124 cases which had received one or two pleural fillings, producing on the whole a fairly pronounced degree of pulmonary collapse. The conclusions reached from the analysis are that pain is alleviated, that dyspnoea is relieved, and that there is some lessening of the toxaemia. The second part of the paper deals with twenty-four unselected cases treated on the third day of the disease or earlier, and eighteen other cases treated on the fourth day of the disease or later, which were specially chosen as being suitable from the point of view of general condition and age. These patients were given as a routine two injections of air of from 300 to 500 c.cm. each, and, later, from three to five refills at four-hourly intervals. The object was to produce massive pulmonary collapse. From their own experience the authors consider that no beneficial effect can be expected after the third day of the disease, and that the best effect is obtained if treatment is administered within two days of the onset. Abernethy, Horsfall, and McLeod,[2] from careful observation of a small series of cases, conclude that pain is diminished, toxaemia is not increased, and there is no shortening of the disease. They also found that in some patients there was an increase in the respiratory distress and in the cyanosis. These last two results were due to interference with the intrathoracic pressures and the resultant interference with respiration and circulation. Howlett, Luft, and Astwood[3] described ten adult patients with a unilateral lesion who each received about 1,000 c.cm. of air in two or more injections. Their conclusions were very similar to those of the Johns Hopkins workers ; they particularly stress the relief obtained from pleural pain, and state that the breathing tends to be deeper and without any respiratory grunt. They found no shortening of the disease. A description of two cases by Shaw[4] is interesting in that it emphasizes the value of pneumothorax treatment in relieving the symptoms due to acute pleural inflammation. He described two patients, both elderly and almost moribund, in whom the pleural pain was so severe as to produce a marked shallowness of respiration and, as a result, an atelectatic pneumonia at the bases. Following the introduction of a shallow pneumothorax (two injections of 200 c.cm.) pain was relieved, breathing became better, and the patients made somewhat dramatic recoveries. It is thus generally agreed that pleural pain, pleural cough, and pleural dyspnoea are immediately and almost magically removed, and that deep and comfortable sleep follows as a natural result. The number of cases in which the fever subsides or the toxaemia is markedly diminished is apparently quite small.

Although the patient obtains some relief from his symptoms from this form of treatment, it is not without its dangers. It has been thought in some cases that the pulmonary collapse has forced infected material from the solid lobe into the opposite lung, converting a unilateral into a bilateral pneumonia. In a few cases the presence of the pneumothorax seems to have prolonged the treatment of empyemata arising during the disease by rendering the encystment of these more difficult. There is, however, no proof that the incidence of empyema is higher in cases thus treated, though in a series of children treated by Harper[5] it was

[1] *Journ. Amer. Med. Assoc.*, 1935, cv, 1488.
[2] *Bull. Johns Hopkins Hosp.*, 1936, lviii, 35.
[3] *Canadian Med. Assoc. Journ.*, 1934, xxxiv, 387.
[4] *Lancet*, 1935, ii, 1281.
[5] *Amer. Journ. Dis. Child.*, 1936, li, 536.

found that the incidence of empyema was slightly increased ; but whether this was fortuitous or the result of the treatment is not clear. Harper also found by careful radiographic examination that herniation of the pleura, across the anterior mediastinum, occurred in eight patients out of twenty-two. In spite of these disadvantages artificial pneumothorax has a definite if limited place in the treatment of lobar pneumonia, especially in those cases in which pleural symptoms loom large in the clinical picture.

CONJUGATE EYE MOVEMENT AND BODY POSTURE

Disturbance of conjugate deviation of the eyes, in the absence of paralysis of any particular extraocular muscle, appears occasionally as an intriguing sign of damage to the brain stem. Its occurrence is usually explained by the involvement of a hypothetical (supranuclear) centre in the region of the nucleus of the sixth nerve controlling deviation of both eyes to the same side, and of another such centre in the region of the nucleus of the third nerve for conjugate upward and downward movement. Dr. L. J. J. Muskens of Amsterdam has subjected the question of the mechanism of these eye movements to experimental analysis, and the accumulated data from his extensive published and unpublished work are summarized in a monograph of over 500 pages.[1] Dr. Muskens's physiological analysis closely relates conjugate movement of the eyes and body posture, indicating a controlling mechanism which not only closely adjusts the two but also serves both functions. As such it forms a system of nervous pathways linking the vestibular nuclei, the oculomotor nuclei, and the basal ganglia. The nervous tract called the posterior longitudinal bundle has long been thought to serve such function, and Dr. Muskens's work extends the mechanism forwards, through the region of the posterior commissure, to the globus pallidus in the basal ganglia. He rejects the notion of supranuclear centres in the brain stem for ocular deviation, and in a very complete review of the literature of clinico-pathological material concludes that loss of conjugate deviation of the eyes with preservation of vestibular nystagmus is due to damage to the pathway from the basal ganglia to the bundle. Paralysis of conjugate deviation with loss of vestibular nystagmus is due to interruption of the posterior longitudinal bundle itself. Though such a conclusion appears justifiable on the physiological evidence, paralysis of lateral deviation without disordered vestibular reflexes, preceding involvement of the sixth nerve nucleus by advancing lesions in the pons, is seen often enough in clinical neurology to leave a strong impression that the pathway for willed lateral deviation of the eyes enters the posterior longitudinal bundle from below. Further, though lateral deviation of the eyes may have physiological representation in the basal ganglia closely proximate to representation of upward movement of the eyes as Dr. Muskens maintains, the manner in which upward movement is usually alone affected by midbrain and pineal tumours still requires explanation. The analysis of cases from the literature supports the case for a combined control of body and eye movements by the globus pallidus. The Parkinsonian syndrome is cited as the outcome of disorder of this system. The details of the pathways concerned, however, remain in considerable doubt for lack of exact data. Cases of cerebral neoplasm do not appear to give sufficiently exact evidence to justify conclusions being derived from them. The common occurrence of paroxysmal disturbances such as oculogyric crises with lack of direct association between the movements of the eyes and of the body would seem to indicate that the physiological association maintained by Dr. Muskens is not a very powerful one. Dr. Muskens is to be congratulated on a very complete survey of the whole field of knowledge of the complex mechanism of the posture of the body and of the eyes, to which his monograph will form a classical contribution.

[1] *Das Supra-Vestibuläre System.* By Dr. L. J. J. Muskens. Amsterdam: N. V. Noord-Hollandsche Uitgeversmaatschappij. (R.M. 25.)

THE FIFTH INTERNATIONAL CONGRESS ON RHEUMATISM

"La Ligue Internationale contre le Rhumatisme," whose president is Dr. R. Fortescue Fox, held its fifth international congress from September 3rd to 8th in Sweden. Recognizing the importance of this event, the editorial staff of *Nordisk Medicinsk Tidskrift* has devoted the whole of its issue for August 29th to the problems of rheumatism. Dr. G. Kahlmeter of Sweden has undertaken the editing of this special number, which is an admirable symposium of some of the most important aspects of the subject. Attached to each article, published in Swedish, is a summary in English, French, or German. A good bird's-eye view of the achievements of the league is given by its secretary-general, Dr. J. van Breemen of Amsterdam. As he points out, the league's activities have multiplied during the last few years in a manner indicative of the importance of its aims. With its headquarters in Amsterdam, it serves as an international clearing-house for everything concerned with rheumatism. There is the journal *Acta Rheumatologica*, which publishes original articles in English, Esperanto, French, and German, as well as abstracts of papers that have been printed elsewhere. When this publication appeared first some six years ago only half a page was required for the abstracts ; now they require four to five pages at a time. The league's library contains more than 5,000 books, and by lectures, exhibits, and the wireless it endeavours continuously to educate the public on the subject of rheumatism. The league has grappled bravely with the thorny problem of nomenclature since the appointment of a nomenclature committee in 1929. It would seem that systems of classification continue to grow in numbers, but in no one country has a nomenclature been devised which is so universally acceptable from a scientific point of view that all the other countries are willing to fall in line and adopt it as their own. After two years of study the nomenclature committee decided to recommend as a working scheme the nomenclature employed in the report of our own Ministry of Health. The league has almost unanimously endorsed this recommendation. Certain other of the league's activities deserve special mention. A form has been devised for recording the most important data in clinical cases. This form has already been adopted in several hospitals, and should do much to ensure uniformity of the data collected for statistical and other purposes. Then there are the international congresses

which are held by the league and which enable delegates from different countries to discuss the social as well as the medical aspects of rheumatism. At these international meetings a special feature has been the demonstration of patients suffering from various forms of the disease. Lastly, the league serves a useful purpose in compiling lists of institutions, hospitals, treatment centres, etc., for the study and treatment of rheumatism throughout the world. Short as is this summary of the league's activities, it should be long enough to afford an introduction to what is surely one of the most important international organizations which have come into being of recent years.

VITAMIN K

The diversity of the physiological processes requiring for their normal course the presence of small quantities of the so-called vitamins is now well recognized, and recent research suggests that coagulation of the blood may have to be numbered among such processes. It has been shown by Dam, and further investigated by Schönheyder,[1] that the blood of chicks suffering from a deficiency of a certain vitamin, named vitamin K, has a remarkably prolonged clotting time. Whereas normal chicks' blood clots in one to ten minutes, that of K-deficient chicks may take up to several hours to clot. The relevant components in such an increase in coagulating time are prothrombin, thrombokinase, and calcium ions, which go to the formation of the enzyme-like thrombin ; this, acting on fibrinogen, leads to the formation of fibrin. The possibility of an accumulation in the serum of an anti-thrombin or anti-prothrombin in excessive amounts has also to be considered. Schönheyder has shown that the abnormal clotting time is not due to insufficiency of thrombokinase, or platelets, or fibrinogen ; nor is it due to an accumulation of anti-coagulating agents in the plasma. Further, although the serum calcium is usually low in the abnormal chicks (the inorganic phosphorus was constantly high), the addition of calcium to the plasma does not shorten the clotting time. It was found that in unit time and under identical conditions far less thrombin was formed in the abnormal plasma after the addition of thrombokinase than in normal plasma: so the most probable explanation seemed to be that the diseased chick's plasma was deficient in prothrombin. This abnormality of the chick's blood can be corrected by the administration of food containing the anti-haemorrhagic factor called vitamin K: such a correction is obtained if 10 to 11 mg. of dried pig's liver is given daily for three days. The estimation of the amount of vitamin K in a given foodstuff is carried out by a curative method, the condition of the blood being tested before and after a period of administration of the food under test. Use is made of the fact that ordinary chick's blood plasma does not clot if the blood is drawn directly from a blood vessel by a cannula: such plasma will coagulate only if a clotting agent (thrombokinase) is added to it. Plasma from K-deficient chicks required enormously greater amounts of thrombokinase (watery extract of hens' lungs) to produce coagulation. The relation between the concentration of the clotting agent necessary to clot the plasma of a K-deficient plasma in 180 seconds and that required to clot a normal plasma gives a quantitative expression of the degree of sickness of the chick. Since K-deficient chicks show as a main symptom a tendency to severe haemorrhages, K may be referred to as the anti-haemorrhagic factor. It is fat-soluble and rather thermostable, and can be distinguished from A, D, and E. One of the sources of vitamin K is hog-liver fat, where it is found in the easily soluble non-sterol fraction of the non-saponifiable matter when cold saponification is used. It is richly present in green vegetables, pig-liver fat, hemp-seed, spinach, and alfalfa, but strangely enough the livers of normal chicks are poor in this vitamin. In a more recent communication Dam, Schönheyder, and Tage-Hansen[2] show that, whereas the usual methods of preparing prothrombin from plasma are quite successful in dealing with normal chick's plasma, prothrombin is not obtained from K-deficient plasma. A concentrate of vitamin K does not accelerate clotting *in vitro* when tested against plasma and thrombokinase, from which it would appear that there is no question of any direct action of the vitamin. As far as this work has as yet progressed it would seem that vitamin K acts most probably in the liver, where the reactions essential for the production of prothrombin proceed.

[1] *Biochem. Journ.*, 1936, xxx, 890.

[2] *Biochem. Journ.*, 1936, xxx, 1075.

LORD NUFFIELD'S BENEFACTIONS

The offer of Lord Nuffield to the University of Oxford to place on trust a sum approximating to one and a quarter million pounds for the development of a medical research school has touched the imagination of the public, not only because of the unexampled scale of the benefaction, but because of the wisdom with which the scheme has been constructed. In an address to the Oxford Luncheon Club Sir Farquhar Buzzard described the offer as being almost as remarkable for its insight into the future of medicine as for its magnitude and generosity. There is satisfaction also that the project should be associated with an ancient university ; some donors, yielding to a pardonable egotism, might have insisted on placing the scheme on an independent foundation. In our last issue we commented on the nature of the offer and the changes it is likely to bring about, and reproduced Lord Nuffield's letter to the Vice-Chancellor. In his reply the Vice-Chancellor (Mr. A. D. Lindsay, Master of Balliol) states that the Hebdomadal Council has received the offer with the liveliest satisfaction and has resolved to promote, at the earliest possible date, the University legislation necessary to give effect to the beneficent proposals. He adds that he will reserve to a more public occasion any attempt to express the feelings of the University concerning the gifts. In an interview given to the Press Lord Nuffield has expressed the hope that the new research school may turn out "about twenty brilliant men in a year," and these will go to other centres to carry on the work of teaching. Thus, although the lamp is to be kindled in Oxford, the whole country will share in the illumination. Similarly, while the work will be done in the closest collaboration with the Radcliffe Infirmary and the other hospitals of the Oxford unit, the experience gained and discoveries made will immediately be transmitted to other medical teaching centres. The gift is the largest ever made by an individual in this country ; this leaves out of account

the Rockefeller Foundation and Carnegie benefactions. Lord Nuffield was already reported to have given over one million pounds to hospitals and other causes. Oxford has enjoyed the lion's share of such giving. To the Radcliffe Infirmary he had given £140,000, to the Wingfield-Morris Orthopaedic Hospital £70,000, and to St. Peter's Hall £72,000. Guy's Hospital, of which he is treasurer, has received £65,000, and Nuffield House at Guy's, opened by the King (then Prince of Wales) less than a year ago, is one example of his interest in that institution. On the morrow of the announcement of the Oxford gift it was stated that Lord Nuffield had made himself responsible for £80,000 in connexion with the Guy's Hospital appeal for nurses' home extensions. This is an appeal for half a million, and the gift is conditional upon £420,000 being subscribed from other sources. To St. Thomas's Hospital he is said to have contributed a total of £104,000, and to the new Birmingham Hospital Centre, £52,000. His recent series of gifts include £5,000 a year for seven years for the development of books for the blind. Even the letter announcing his Oxford offer was accompanied by the handsome postscript that he wished to give, in addition to the one and a quarter million, a further £100,000 in response to the appeal which is to be made on behalf of Oxford University for the new Bodleian Library and other objects. A few days later came the news of a gift of £30,000 to the Acland Nursing Home at Oxford. This is indeed princely giving. In making great donations during his lifetime instead of posthumous bequests, Lord Nuffield, who is not yet 60, will have the satisfaction of seeing rise, tier by tier, the large constructions which his dedicated wealth has made possible.

ACCURACY OF BIOLOGICAL ASSAYS

Methods of biological assay have been a subject of intensive study during the past decade. This work has revealed the existence in animals of individual variation of an extent that was previously unsuspected. Furthermore, it was found that this variation in most cases was of a skew type. If, for instance, half the mean lethal dose of drug killed 10 per cent. of animals, then 10 per cent. would survive twice the mean dose. The existence of a wide variation distributed in this manner has made it very difficult to estimate the probable accuracy of many forms of biological trial. A subcommittee of the British Pharmacopoeia Commission has now dealt with this intricate problem.[1] It chose the occurrence of an event ninety-nine times out of a hundred as being equivalent to a certainty for purposes of assay, and on this basis calculated the limits of certainty of various biological assays proposed for inclusion in the forthcoming *British Pharmacopoeia* addendum. The majority of the methods of bio-assay of antisera show a surprisingly high accuracy. For example, if the assay of gas-gangrene antitoxin (*Vibrion septique*) gives a result of 100, then the true figure will lie between 89 and 111 in ninety-nine cases out of a hundred. The biological assays of the vitamins give much less exact results, and in several cases the percentage limits of error are as wide apart as 30 and 300, and in one case these figures are 15 and 650. The results summarized in this report were obtained by the analysis of experiments on very large populations of animals, and called for difficult mathematical treatment. The variations revealed as regards the accuracy of the different forms of biological assay are surprising, and a statement of these limits of error will make much clearer the real significance of the results of the various forms of trial.

[1] British Pharmacopoeia Commission Reports of Committees. No. 10. Report of the Subcommittee on the Accuracy of Biological Assays. 1936. Published by authority of the General Medical Council. (1s. 6d.)

BATTERSEA GENERAL HOSPITAL MEDICAL STAFF

In our advertisement columns this week will be found a list of all appointments at the Battersea General Hospital, London. This institution was the Anti-Vivisection Hospital, but is now a properly constituted incorporated general hospital, all reference to anti-vivisection having been removed from the Articles of Association by an Order of the Court before Mr. Justice Eve. Since the Court Order the hospital has been recognized by King Edward's Fund and all such bodies, and the City Companies. It has been found necessary to reduce the number of honorary appointments, and, with a view to establishing the hospital on a sound basis and demonstrating to the public and local practitioners that the whole of the appointments have been made by open competition, the hospital board of management has, by virtue of a resolution and an agreement with the present honorary staff, decided that all appointments shall terminate and expire on December 31st, 1936. It is expected that members of the present staff will apply for the vacant appointments, and, other things being equal, preference will be given to such applicants. All candidates for the appointments will be chosen by an independent and competent medical selection committee, and the board of management will accept the recommendations of the selection committee. Pay-bed accommodation has been provided, and there is now every reason to anticipate that the hospital will be able to balance its budget and that its future will be one not only of improved financial stability, but also of increased usefulness to the community.

MEDICAL RESEARCH COUNCIL

By an Order of the Committee of the Privy Council for Medical Research, Lord Balfour of Burleigh and Dr. John Mellanby, F.R.S., Waynflete Professor of Physiology in the University of Oxford, are appointed members of the Medical Research Council in succession to the Marquess of Linlithgow and Professor E. D. Adrian, M.D., F.R.S., who retired in rotation on September 30th. The appointment of Professor Mellanby was made after consultation with the Medical Research Council and with the President of the Royal Society. Lord Balfour of Burleigh has now been appointed by the Medical Research Council to be its chairman in succession to Lord Linlithgow, and this has been approved by the Committee of the Privy Council.

Mr. Walter Howarth will deliver the Semon Lecture for 1936 on "Some Tumours and Ulcers of the Palate and Fauces," at 1, Wimpole Street, W., on Thursday, November 5th, at 5 p.m. The lecture is under the auspices of the University of London, and the chair will be taken by Mr. Lionel Colledge.

THE ENDOCRINES IN THEORY AND PRACTICE

This article is one of a series on Endocrinology contributed by invitation

HORMONES OF THE ANTERIOR LOBE OF THE PITUITARY GLAND

BY

E. C. DODDS, M.V.O., M.D., D.Sc., F.R.C.P.

AND

R. L. NOBLE, M.D.Toronto

This article attempts to give a general view of the present state of our knowledge of the function of the anterior lobe of the pituitary gland. In view of the extreme complexity of the subject and the limited space it is possible to outline only the main branches of this work. Detailed experimental evidence for the statements made, therefore, is not given, but may be obtained from the bibliography at the end of the article.

The functions of the anterior lobe of the pituitary are best demonstrated by observing the effect of hypophysectomy: the resulting changes, however, are found to differ according to whether the animal is operated upon before or after puberty. If the gland is removed before puberty then normal sexual development does not occur and the growth of the skeleton is much retarded. In the adult hypophysectomized animal by far the most noticeable change is in the sex organs. In the male rapid atrophy of the testes begins almost immediately, and at the same time there is atrophy of the external genitals and the seminal vesicles. In the female the oestrous cycle ceases and atrophy of the ovaries and uterus results. The changes appear to be more rapid in the male, and by the end of ten to twelve days a very marked difference can be noticed between the operated and the control animals.

Owing to the number of hormones secreted by the anterior lobe of the pituitary gland it will be clearer to tabulate the known ones and to discuss them in detail.

1. Gonadotropic hormone.
2. Growth hormone.
3. Thyrotropic hormone.
4. Adrenotropic hormone.
5. Lactogenic hormone or prolactin.
6. Parathyrotropic hormone and pancreatic hormone.
7. Diabetogenic hormone and ketogenic hormone.

The Gonadotropic Hormone

This hormone controls ovarian periodicity in the female and development of the testes and seminal vesicles in the male. Hypophysectomy is followed by rapid degeneration of the testes or the uterus and ovaries. If into such a hypophysectomized animal grafts of anterior pituitary are implanted these changes can be prevented. The injection of an acid extract of the anterior lobe into either a hypophysectomized female or a normal one will induce ovulation and maturation of a number of Graafian follicles. If an alkaline extract of the anterior lobe is injected into the female animals then direct luteinization of the follicles will occur without rupture and ovulation. From this it would appear that in the pituitary there are two sorts of gonadotropic hormone: one responsible for maturation of the follicles and ovulation, which has been called prolan A; and a second hormone responsible for luteinization, which has been called prolan B.

A gonadotropic hormone is excreted in the urine of pregnancy, and the demonstration of its presence forms the basis of the well-known Aschheim-Zondek test for pregnancy. It has been claimed that it is possible to separate this also into the two factors prolan A and B, yet it seems that up to date no complete separation has been accomplished. Recently Evans in California and Hamburger and his co-workers in Copenhagen have described another substance with pronounced gonadotropic activity in the serum of the pregnant mare; this has been referred to as "antex." This hormone apparently has an intense stimulating action on the ovary, and is much more powerful than either the gonadotropic hormone extract from the pituitary or urinary prolan. It again differs from the hypophyseal hormone in that its injection into animals is not followed by its secretion in the urine, which is the case with both urinary hormones and the anterior lobe substance.

In animals which ovulate only after coitus it can be proved that this is due to secretion of gonadotropic hormones from the anterior lobe of the pituitary, since such ovulation cannot be obtained in the hypophysectomized animal. Prolan also appears to be secreted by the placenta, and it is possible that this organ is the source of urinary prolan in pregnancy. It is also found in the urine in cases of chorion epithelioma and hydatidiform mole. In the latter two conditions there is frequently a much greater amount of gonadotropic substance present than in normal pregnancy.

The Growth Hormone

As already pointed out, removal of the pituitary in the young animal causes retardation in the growth of the skeleton. In such hypophysectomized animals growth may be restored by the injection of anterior lobe extract. The first demonstration of the presence of the growth hormone was made by Evans, who produced abnormal excessive growth in numerous rats by the intraperitoneal injection of extract of the anterior lobe. The hormone seems to affect mainly the immature animals, and has little or no effect on normal adults. The question of the production of giant animals has been subject to much discussion, as some workers are of the opinion that it is not possible to produce giant animals owing to the production of an anti-growth hormone. The injection of the growth hormone, therefore, will tend to produce an acceleration in development of the immature animal, but when this has reached its maximum the injections apparently lose their effect. Recently a very beautiful demonstration of the growth hormone has been made by Kemp and his co-workers, who have shown that the injection of the hormone into a special strain of dwarf mice results in the normal growth of these animals. There can be little doubt that this method forms the basis of standardization, since it is much more clear-cut than any method hitherto proposed.

The association of a disturbance of the pituitary gland with regard to skeletal abnormalities has been known for many years. The disease acromegaly may be regarded as a condition in which there is an overproduction of growth hormones in persons after the age of puberty—that is, after the union of the epiphyses. If the condition arises before puberty then gigantism will result. In both cases characteristic growth of the bones of the face, hands, and feet produces the well-known clinical features of the disease.

The Thyrotropic Hormone

One of the effects of hypophysectomy is the rapid atrophy of the thyroid gland and reduction of the basal metabolic rate. It is possible to prepare from the anterior lobe of the pituitary a substance which, on injection, will stimulate the atrophied thyroid of the hypophysectomized animal. If this is given in excessive quantities, either to the hypophysectomized or to the normal animal, a condition of overactivity of the thyroid gland will supervene. This is associated with an increased basal metabolic rate and histological evidence of the disappearance of colloid and thickening of the epithelium of the thyroid gland. Exophthalmos can also be produced in experimental animals. It has been suggested that Graves's disease is due to overaction of the anterior lobe of the pituitary, giving rise to stimulation of the thyroid through the thyrotropic hormone. There is little experimental evidence in favour of this theory at present, although at first sight it is very attractive.

One of the most interesting facts concerning the thyrotropic hormone has been the observation that its injection leads to the production of an "anti" substance. It has been shown that if the hormone is injected into an animal the basal metabolic rate rises, stays up for some days, and then falls. At this time it is impossible to bring about a further rise, no matter how much thyrotropic hormone be given. This was demonstrated by Collip, who ascribed this falling-off in action as being due to the secretion of an anti-thyrotropic hormone. He and his co-workers were able to show that immunity could be transferred by injecting the serum of an immunized animal into a normal one. This has led Collip to postulate what he calls the theory of inverse proportion—namely, that the activity of any hormone depends upon the balance between it and its anti-hormone.

The Adrenotropic Hormone

Following hypophysectomy there is a rapid decrease in the size of the adrenal cortex. This atrophy can be prevented by the fresh pituitary transplants or administration of a suitable extract of the anterior lobe of the pituitary, the adrenotropic hormone. Such a relationship is supported by the clinical evidence that in acromegaly and basophil adenoma of the pituitary thickening of the adrenal cortex occurs. No effect of this hormone on the adrenal medulla has been demonstrated.

Lactogenic Hormone or Prolactin

It has now been shown that the anterior pituitary secretes a hormone called prolactin, which is responsible for the initiation of the secretion of milk. The isolation of this hormone has come about mainly through the work of Riddle, who has demonstrated that enlargement of the crop glands of the pigeon can be produced by extracts of the anterior lobe of the pituitary. In the past, in the mammal it has been usual to regard the secretion of milk as being associated in some way with the corpus luteum hormone. It can be demonstrated, however, that oestrogenic hormones alone are responsible for building up the structure of the mammary gland suitable for a period of lactation, and that the actual secretion of milk can only be induced by the hormone prolactin.

A hypothesis has been suggested that during pregnancy the large amount of oestrogenic substance present gives rise to a growth of the mammary glands and at the same time suppresses the action of the lactogenic hormone. Following parturition the sudden drop in oestrogenic substance in the blood stream allows the pituitary hormone to act and milk secretion to begin.

The Pancreatic and Parathyrotropic Hormones

It has been maintained by various workers that there is definite evidence of histological change in the parathyroid glands and in the islands of Langerhans following hypophysectomy. These changes, it is claimed, can be prevented by the injection of an extract of the anterior lobe of the pituitary. In so far as is known, however, there is no gross alteration in calcium metabolism following hypophysectomy, and it would therefore appear that the parathyroid glands have a much greater power of autonomous action than, let us say, the gonads, the thyroid, or the suprarenal glands. Whereas alterations may take place in the carbohydrate metabolism of the hypophysectomized animal, these are hardly the type that could be attributed to an atrophy of the pancreas.

Diabetogenic and Ketogenic Hormones

The position of these hormones is extremely unsatisfactory. Their demonstration is due to the important work of Houssay, who was able to demonstrate that if a pancreatectomized dog, and therefore a diabetic one, is also subjected to the operation of hypophysectomy both the ketonuria and glycosuria would disappear. Such an animal, known as the "Houssay dog," is very sensitive to insulin, and tends to suffer from spontaneous hypoglycaemia. Now if into such a dog an extract of the anterior lobe of the pituitary is injected ketosis and glycosuria will arise, and the dog will take on the general characteristics of an ordinary depancreatized animal. This hormone is known as the diabetogenic hormone, and according to some workers consists of two fractions—one responsible for the production of glycosuria and the second for the production of ketosis. The position, however, is extremely complicated, and no definite opinion can be given as to the role of these hormones.

Nothing is known with regard to the chemical constitution of these various fractions that have been discussed. The gonadotropic and thyrotropic hormones seem to be very definitely of a protein character, since their action is destroyed by proteolytic enzymes. The other fractions are probably of a similar nature. The development of anti-hormones following prolonged injection of these substances appears to be especially related to anterior lobe hormones. Up to the present potent anti-hormones have been prepared for the gonadotropic, thyrotropic, ketogenic, and growth fractions.

Relation between the Pituitary and other Ductless Glands

The relation between the pituitary and other ductless glands can be gathered from the preceding synopsis, so that here a brief summary only is necessary. Clinically, cases of Simmond's disease are found to demonstrate the importance of the pituitary gland in maintaining endocrine equilibrium. In this condition there is a destructive lesion of the anterior lobe of the pituitary, and characteristic degeneration of gonads, thyroid, adrenals, and pancreas develop. Marked loss of weight and extreme cachexia are also present. The typical picture of Simmond's disease is seen to be similar to that portrayed by an experimental animal following hypophysectomy. Definite changes can be found in the animal's general growth and condition. Typical histological and functional alterations are found in the gonads and reproductive system, thyroid, adrenals, mammary gland, and possibly the parathyroids and pancreas. Such an animal, rather than a normal one, is essential for the demonstration of the various hormones obtained from the anterior lobe of the pituitary. The effect of pituitary hormone deficiency on other endocrines has been stressed, because as such it has been of primary significance in the physiological investigation of this gland.

The demonstration, however, that removal of endocrines such as the gonads or that large or prolonged injections of their extracts may lead to definite changes in the pituitary, suggests that an exceedingly complicated pituitary endocrine mechanism is normally present.

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ADDENDUM TO THE BRITISH PHARMACOPOEIA

THE FORTHCOMING ISSUE

In accordance with the recommendations of the Subcommittee on the British Pharmacopoeia of the Committee of Civil Research the general scheme of revision of the *British Pharmacopoeia* provides for publication of a new pharmacopoeia every ten years.

Meanwhile the *British Pharmacopoeia*, 1932, is brought up to date by an Addendum, which is announced for publication on December 29th, 1936. In order to allow pharmacists and manufacturers to prepare drugs beforehand according to the new standards advance copies are made available three months before the date of publication for inspection by those interested.

In February of this year the Pharmacopoeia Commission issued a report (No. 9 of the series) containing the recommendations of its committees with regard to the material to be included in the Addendum. The advance copy of the Addendum, which we have received, shows that, in the main, the recommendations of the committees have been accepted by the Pharmacopoeia Commission.

New Material in the Addendum

The Addendum contains some interesting new material. It is a trite remark that each *British Pharmacopoeia* is in its scope to some extent behind the times. This is inevitable, since the hall-mark of pharmacopoeial recognition can properly be given to a remedy only after its value has been fully proved in practice. A further difficulty arises from the fact that many of the newer drugs which achieve popularity are the subject of patent restrictions. The following reference to this difficulty occurs in the Introduction to the Addendum:

> "The Commission has found it necessary to exclude, on account of proprietary monopolies or restrictions, certain drugs which otherwise might have been included."

The new substances described include two organic pentavalent arsenical compounds: acetarsol, 3-acetylamino-4-hydroxyphenyl-arsonic acid, which is intended for oral administration, and tryparsamide, sodium N-phenylglycineamide-*p*-arsonate, for subcutaneous, intramuscular, and intravenous injection.

The Vitamins

The subject of vitamins is well covered, the work of the chemists on the synthetic side being duly recognized. In the standardization of vitamins the international units and standard preparations are adopted. The article on cod-liver oil has been rewritten, and a minimum standard of 600 units of vitamin A activity and 85 units of antirachitic activity is now required. No preparation of vitamin A alone is included. Vitamin B is represented by pulvis vitamini B_1, an adsorbate of the antineuritic vitamin upon fuller's earth, containing in 1 gram 100 units of antineuritic activity (vitamin B_1). Vitamin C is described in the form of the chemical ascorbic acid, the enolic form of 3-keto-*l*-gulofurano-lactone, obtained either from *Capsicum annuum* or by synthesis. It is required to contain not less than 98 per cent. of the pure compound as assayed by titration with iodine. A biological assay for this vitamin is not demanded, but a footnote states that, if the substance is tested by the biological assay of antiscorbutic activity which is contained in an appendix to the Addendum, it contains in 1 gram 20,000 units of antiscorbutic activity (vitamin C). Vitamin D is now represented by the chemical compound calciferol, obtained by ultra-violet irradiation of ergosterol in a suitable solvent. It is required to contain in 1 milligram 40,000 units of antirachitic activity. The daily doses for an infant are stated as: prophylactic, 1/2400 to 1/1200 grain (1,000 to 2,000 units); therapeutic, 1/1200 to 1/800 grain (2,000 to 3,000 units). Liquor calciferolis, a solution of calciferol in oil, replaces liquor ergosterolis irradiati of the *B.P.*, 1932.

Antitoxins and Sera

Five preparations of the group of antitoxins and sera are described. These follow the international requirements as regards units and standard preparations to be used in the assay, and the monographs contain much the same information and requirements as to storage, labelling, etc., as those in the *B.P.*, 1932. Serum, dried serum, solution of antitoxic globulins, and dried antitoxic globulins are all recognized, and the requirements are in accord with the Therapeutic Substances Regulations. Antitoxinum oedematiens contains the specific antitoxic globulins against the toxin of *Clostridium oedematiens*; antitoxinum staphylococcicum against certain strains of staphylococcus; antitoxinum vibriosepticum against the *Clostridium*, commonly known as "vibrion septique." Anti-pneumococcus sera for Type I and for Type II are described, and the dosage by intravenous injection in each instance is 50,000 to 150,000 units.

Bismuth Injections: Ergometrine

In view of the continued use of injections of bismuth in various forms, two new compounds are introduced. Bismuth and sodium tartrate, containing 35 to 42 per cent. of bismuth, is described, and directions for the preparation of sterile solutions for injection are given. Bismuth oxychloride, containing 79 to 81 per cent. of bismuth, may be given orally or intramuscularly in the form of injection of bismuth oxychloride containing 10 per cent. w/v of the drug in a 5 per cent. dextrose solution.

The recent work on ergot and the discoveries of Dudley and Chassar Moir are recognized by the inclusion of a monograph on the alkaloid ergometrine. The oral dose is stated as 1/120 to 1/60 grain. Although when this alkaloid is required for injection a salt is used, no salt of ergometrine is described in the Addendum, but under the description of the alkaloid the following doses are stated: by intramuscular injection, 1/240 to 1/120 grain; by intravenous injection, 1/480 to 1/240 grain. These presumably are to form a guide to dosage in the use of the salts.

Mercurial Diuretics and Other New Drugs

The value of organic mercurial diuretics is recognized in the inclusion of a substance of this class under the name of "mersalyl," which is described as the sodium salt of salicyl-(γ-hydroxymercuri-β-methoxypropyl) amide-*o*-acetic acid, containing 38.5 to 40.5 per cent. of mercury. An injection of mersalyl is described containing 10 per cent. w/v of the mercurial compound with 5 per cent. w/v of theophylline. No dose is stated for mersalyl itself, and the following footnote is added to the monograph: "Solutions of mersalyl, containing sodium chloride or other salt, may become toxic unless some substance, such as theophylline, which inhibits the decomposition of the mercurial complex, is present. For injections, injection of mersalyl should be used." A monograph defining the purity of theophylline is included, but no dose is stated.

Chiniofon represents a drug which is used in the treatment of tropical dysentery. This is described as a

mixture of approximately four parts by weight of 7-iodo-8-hydroxyquinoline-5-sulphonic acid and one part by weight of sodium bicarbonate.

The monograph on calcium gluconate describes the normal calcium salt. Only the oral dose is stated, 30 to 60 grains, and no reference is made to the use of this substance by injection. It is well known that the methods of preparing injections of this substance are the subject of patents.

Hydrated calcium chloride, $CaCl_2,6H_2O$, is defined for the purpose of providing a pure material for the preparation of injections. An instruction is included that, when calcium chloride is prescribed for injection, twice the prescribed amount of hydrated calcium chloride shall be dispensed.

The need for a stable form of ferrous chloride which can be compressed into tablets is met by the introduction of citrated ferrous chloride. This compound has been introduced only comparatively recently into medicine. The dosage is stated as 3 to 5 grains, the maximum dose representing about 1½ grains of iron.

Two new preparations of stramonium are introduced, a liquid extract which is diluted to make the tincture, and a dry extract containing 1 per cent. of alkaloids calculated as hyoscyamine, which can be conveniently made up in tablets for use in the treatment of post-encephalitic Parkinsonism. The ordinary dose is stated to be 1/4 to 1 grain, and that for post-encephalitic and similar conditions 1 to 8 grains.

Lugol's solution is now described under the name of "liquor iodi aquosus," making in all four different solutions of iodine now official. It contains 5 per cent. w/v of iodine and 10 per cent. w/v of potassium iodide.

Other new drugs described include sodium thiosulphate, evidently included on account of its use in the treatment of toxic effects from organic arsenical drugs and other preparations of heavy metals; and argentoproteinum, a silver protein compound of the protargol type, containing 7.5 to 8.5 per cent. of silver.

Two materials used for diagnostic purposes have been added. Histamine acid phosphate, which is now used by subcutaneous injection in order to stimulate the secretion of hydrochloric acid for the fractional test meal, and oleum iodisatum, an iodized poppy-seed oil containing 39 to 41 per cent. of combined iodine for use as an opaque *x*-ray medium.

Miscellaneous Changes

The Addendum contains also a large number of references to the substances in the *British Pharmacopoeia*, 1932, in which changes in pharmaceutical processes or analytical standards are made. The doses of two substances are changed. The maximum dose of cinchophen is reduced to 10 grains and the dosage of iron and ammonium citrate is increased, becoming 20 to 40 grains.

The monographs on acriflavine, sterilized water, and physiological solution of sodium chloride have been rewritten. The changes in the two last-named monographs indicate that attention has been given to the subject of sterilization, and this is shown also by the note in the appendix which requires that when tyndallization is practised aseptic methods must be used.

The appendices contain descriptions of reagents required in the various tests; some modifications of the analytical methods of the *British Pharmacopoeia*, 1932, are also included. Full descriptions of the biological methods of assay required for the vitamins and for the antitoxins and sera are given. In connexion with these biological assays, it is interesting to note the limits of error which are stated. These give valuable indications of the degree of accuracy obtainable in this class of analysis. The subject of the accuracy of biological assays was recently investigated for the Pharmacopoeia Commission by a special subcommittee, whose conclusions are referred to this week at page 823.

The Pharmacopoeia Commission

Compliments are due to the Pharmacopoeia Commission and its committees upon the successful completion of an arduous task. The membership of the Commission for the years 1933–6 is as follows:

A. P. BEDDARD, M.D., consulting physician to Guy's Hospital (*Chairman*).
R. R. BENNETT, B.Sc., chairman of the British Pharmaceutical Conference, 1928 and 1929.
O. L. V. S. DE WESSELOW, D.M., professor of medicine in the University of London.
J. A. GUNN, M.D., professor of pharmacology in the University of Oxford.
P. HARTLEY, C.B.E., *M.C.*, D.Sc., professor of Biological Standards, National Institute for Medical Research, Hampstead.
B. F. HOWARD, vice-president of the Institute of Chemistry, 1930–3.
D. HUNTER, M.D., physician with charge of out-patients to the London Hospital.
T. TICKLE, B.Sc., public analyst to the County of Devon.
C. H. HAMPSHIRE, M.B., B.Sc. (*Secretary*).

THYROTOXICOSIS AND HEART DISEASE

STRICKLAND GOODALL MEMORIAL LECTURE

The first Strickland Goodall Memorial Lecture was delivered on October 14th in the Great Hall of the Society of Apothecaries by Dr. JOHN HAY of Liverpool.

The lecturer began his address by paying a tribute to the outstanding character and personality of Dr. Joseph Strickland Goodall and to his very valuable work as a cardiologist. Working in the laboratory of the late Professor Augustus Waller, he was one of the first to demonstrate action currents in the heart by means of the capillary electrometer, and following up this work he became a pioneer of electrocardiography. He was one of the first to recognize the importance of thyrotoxicosis in bringing about myocardial changes. It was he also who first clearly emphasized, at a time when there was much opposition to the surgical treatment of Graves's disease, the importance of thyroidectomy in thyrotoxicosis as a means of preventing the progressive cardiovascular changes which result if this condition is unrelieved; and it must not be forgotten that Goodall was advocating thyroidectomy at a time when the operation was looked on with grave doubts by both physicians and surgeons. In 1885 Charcot had described the atypical varieties of Graves's disease called "formes frustes," and in 1899 Krause had drawn attention to the importance of the heart in hyperthyroidism, but it was left to Strickland Goodall a few years later to insist on the fact that many cases of cardiac disorder were primarily due to unrecognized thyrotoxicosis. Dr. Hay dealt chiefly with the subject of masked thyrotoxicosis. Certain cases of hyperpiesis and cardiac pain were now found to be due to this condition. He stressed the point that there was no rest night or day for the heart overdriven by an overactive thyroid, and that many cases received much benefit from removal of the whip action of the thyroid by the carrying out of thyroidectomy. The lecturer pointed out that the clinical manifestations of the cardiovascular complications dominated the picture in nodular toxic goitre, and that this type of thyroid disease occurred as a rule in older subjects in whom cardiovascular changes were likely to occur quite apart from thyroid disease, whereas in the younger subjects of diffuse toxic goitre this complication was not present to the same extent.

Dr. Hay gave a masterly account of the present position of our knowledge of the cardiac complications of thyrotoxicosis, and concluded by emphasizing the danger of allowing this condition to go unchecked. He believed the public were not educated to the fact that "a grumbling goitre was as dangerous as a grumbling appendix."

A vote of thanks was proposed by SIR WILLIAM WILLCOX and seconded by Dr. JOHN PARKINSON, each of whom paid tribute to the character and great work of Strickland Goodall and to the excellence of the address which the lecturer had delivered. The vote was heartily carried by an appreciative audience, among whom were Mrs. Strickland Goodall and her son and daughter-in-law.

MATERNITY IN ITS SOCIOLOGICAL ASPECTS*

BY

SIR HENRY BRACKENBURY, M.D., LL.D.

It is my design to speak to you on the subject of maternity, and to consider it from the sociological standpoint, not at all from the clinical, except incidentally. In doing this I find it convenient to divide our consideration under three headings: maternity and population ; selective maternity ; and the social conduct of maternity.

Maternity and the Population

The population of Great Britain, as ascertained by the last census, was 44,790,485. Every one of these persons had a mother. It is true that each of them had also a father, but this is a matter of much less importance as regards both quantity and quality. Each of us, at any given moment, is an end-result of heredity and environment. As regards the former, indeed, father and mother have an equal share ; but heredity, as a cause, is complete at the moment of fertilization, whereas from that moment environment begins to act. Throughout the first nine months of the most rapid and potent development of the human individual the mother is the complete environment ; during the subsequent five or six years at least it is, in general, she who exercises the predominant influence. As a rule it is only after this formative period, when the essential features of the personality, both bodily and psychical, have become relatively fixed, that the environmental influence of the father, and of others, begins to tell. In certain calculations with regard to numbers also we may in practice disregard the father almost entirely.

We cannot tell accurately what the population of Great Britain will be when the next census is taken in 1941. It is safe to assume that the numbers will be higher than those of 1931, but it is equally safe to suppose that they will have passed their peak and be on the down grade. If the number of births and deaths, of immigrants and emigrants, for any given period were exactly known it would, assuming the previous census figures to be accurate, be easy to calculate the population at the end of that period. These numbers, however, are not exactly known, but they can be approximately estimated year by year for a few years. Such approximations are useful for several purposes, but the longer the period the greater is the margin of error, and to use this method of calculation over decades or generations is futile. An altogether different method is required if we are to gauge the numerical tendency of a population over such considerable periods of time.

The birth rate and the death rate, as usually stated, are the number of births and deaths respectively per 1,000 of the population in a given year. The fertility rate is the number of births per 1,000 wives of child-bearing age. These are crude figures, and for most purposes they require to be corrected or standardized. For the purpose of describing the fertility trend of a large population both illegitimate births and male births may safely be ignored. The significant criterion is the numerical relation between mothers and daughters generation by generation. This can be calculated without further correction from the fertility rates prevailing over a relatively short period of time, say, not more than five years ; thus what is called the " gross reproduction rate " is found. This is defined as the number of girl children likely to be born to a woman passing through the whole child-bearing period—a useful and significant figure. Clearly, if it is below unity the population is bound to diminish, even if the risk of death be reduced. In Great Britain this rate is now a little below unity.

*An address to the York Medical Society, at the inaugural meeting of the new session, October 7th, 1936.

It is at once evident, however, that further allowances have to be made. Not every girl born survives to the age of 15 years, which may be taken as the minimum age of maternity in this country. Not every girl of 15 years survives to the age of 50 years, which may similarly be taken as the maximum age. Not every woman between those ages marries or becomes a mother. The death rates below 15 years of age and for every year from 15 to 49 are known ; the marriage rate and the age at marriage are also known. From these data the average number of female children that will be born to every newly born girl can be ascertained, and this is known as the " net reproduction rate." In effect it represents the number of mothers in one generation as compared with the number of mothers in the preceding generation. A net reproduction rate of unity means that every mother will be replaced by another mother and no more. Throughout almost every part of Western civilization the rate now is probably well below unity ; exceptions may be Russia, outside the two or three largest towns, and Italy as a temporary phenomenon. In Great Britain it is said to be between 0.7 and 0.75. This is the lowest, or among the lowest, of all national rates, and it is tending still to fall.

Special Considerations

Certain explanations or provisos should accompany this simple statement. As has been pointed out, in these figures we are not dealing with the whole population but with the female reproductive group only. Moreover, we are seeking to discover a tendency and the velocity of a tendency rather than a number. To this end we are assuming the constant continuance of the recent fertility and mortality rates. The effect depends also upon a stable age distribution of the population having first been reached. The scale of the relative proportions within a population of those below 15 years of age, those between 15 and 50 years, and those over 50 years is a very important matter ; we are now witnessing great changes in this respect. Our population has been growing definitely older ; the proportion of children under 15 years of age is becoming rapidly less. It has been calculated that it requires about two generations from the beginning of a definite fall in the birth rate for such a stable age composition to be reached. Such a fall began in Great Britain certainly not later than 1871. We may therefore make our calculations with some assurance, in the knowledge that the net reproduction rate represents a high degree of approximation to the rate of growth to which our recent population is tending.

If this rate remains as at present and the other relevant factors do not change, the population will be reduced by more than one-quarter in each succeeding generation. In thirty years it would be about 33,000,000 ; by the year 2000 it would be less than 25,000,000 ; in the year 2100 it would reach some 10,000,000, about the population of Greater London to-day. If the present tendency for the net reproduction rate to fall continues, the numbers would, of course, be reduced even more catastrophically than indicated, and we have no reason to believe that the decline, or the acceleration in the rate of decline, will stop at any fixed point unless we can also demonstrate the likelihood of the responsible factors changing at that point.

It is no part of my business to point out to you the dire consequences, national and international, economic and social, of such a state of things ; nor do you need such a demonstration ; but surely no further proof is required of the necessity of a profound change, both individual and national, in our attitude towards maternity. Taking a wide view of the world's history, it is likely that a very slowly increasing population should be regarded as the normal condition. The nineteenth century in industrial England and elsewhere was exceptional. At present the facts show that in Great Britain, even in order to maintain a stationary level of population, each married woman should have at least three children. Since, perhaps, one marriage in six is sterile, this means that in many families there should

be four or five children. A widespread propaganda tending to diminish births is the opposite of what is required.

Fallacies in the Birth Control Campaign

Nevertheless there is a considerable body of members of the medical profession, as well as larger numbers of well-meaning persons outside it, who consider it their duty actively to encourage and conduct a campaign of such a kind. A few of them are genuine scientific inquirers who regard themselves as taking part in valuable experiments, and are prepared to form, or to change, their opinions according to the results apparently obtained. Some of them are eminent persons, much respected within the profession and of great influence with the public, who have prematurely formed definite opinions upon premisses which are not wholly true, or without giving due weight to all relevant factors. In expounding the subject, even to audiences such as this, they simplify complicated matters so much that their presentation becomes a false one, or fall into elementary errors so that they mislead a public which, though often prejudiced in one direction or another, genuinely desires to be informed. Others are mere zealots who, having espoused a cause, never revise the foundation of their belief, let their emotions have free vent, and confound reason, even though their discussion, based on emotion, may assume a pseudo-scientific guise.

At the bottom of all this lies, I suspect, the fact that for several generations we have been taught to believe that too many people are being born ; we have assumed that this will continue to be the case, and have become accustomed to a pattern of social behaviour formed on this belief. The motive usually assigned for conducting widespread propaganda in favour of restrictive or selective maternity is either tenderness for the economic status of the individual or regard for the eugenic results on posterity. Occasionally, and wisely, purely medical reasons are put in the forefront ; it may be granted at once that in the aggregate there are a considerable number of cases in which the physical or psychological condition of the patient not only justifies but urgently demands advice and action directed towards temporary precaution or even permanent infertility. There are doubtless, also, a relatively small number of cases in which altogether exceptional untoward social circumstances, or the practical certainty that grave mental or physical defects will be handed on to all or most of the offspring, may in the opinion of many justify such advice or action. But it is entirely wrong, or at least very unsafe, to assume that the possession of a moderately large family must be socially or economically disadvantageous, or that unemployment varies in amount relatively to the size of the population, or that the science of genetics has yet advanced so far as to enable us to determine in more than a few cases what disadvantageous characteristics will be manifested by a particular offspring or what will be the exact requirements of such offspring in future states of society.

Nearly all our now considerable knowledge of human genetics has been the outcome of the last twenty years, but this progress has revealed in even greater measure the vast fields in this science of which we are entirely, or mainly, ignorant. It is curious, also, that people should be assumed to limit their families because they are prosperous and yet be urged—and taught—to do so because they are poor. It may yet be that the large family will be found so socially valuable as to constitute in future a superior class. Nor is it yet certain that the progressive decline in the reproduction rate is so inevitable that we must forthwith concentrate all our attention upon the elimination of the unfit, even if we know who they are going to be, from the smaller population. It may still be possible to prevent the decline.

Facts of Population Dimensions

Always admitting, and even emphasizing, the restricted, but very important, fields of action previously indicated, most of those who advocate widespread " birth control " or the extensive practice of sterilization, even if controlled and voluntarily accepted, or the further legalization of abortion need to be reminded—though some of them should not stand in that need—of a number of facts or considerations which they forget, ignore, or fail to realize. Those to whom this propaganda is addressed should beware of them also. I will name the most important of them.

In the first place, the immediate and grave menace to this country in particular, and to Western civilization in general, is under-population, not over-population. Measures which tend to discourage the birth of normal children—even though it be at the risk of the production of some undesirables—may be socially and nationally dangerous.

Secondly, social environment is of paramount importance, and must be given much more weight. Its effects are so powerful that they easily mask those of heredity. It can produce both physical and mental characteristics which may be mistaken for inherited defects. The real requisite for general racial improvement, or for the scientific study of inherited human differences, is the improvement of environment and the removal of inequalities of environment. Only when this is effected can we expect to get extensive conclusive evidence of differential genetic equipment.

Thirdly, there is no convincing evidence that the children of the poorer classes are inherently of inferior stock. Moreover, the differences in the birth rate of the several social classes are definitely diminishing. At the beginning of this century the birth rate of " labourers " was more than three and a half times that of the wealthy ; recently it has been only about one-third larger. In Stockholm complete parity has already been reached.

Fourthly, there is no excessive fertility among those of low intelligence. A careful investigation has recently been undertaken by expert workers of all the children in an extensive community. This has only just been completed as regards the relationship between the degree of intelligence and family size. Judging from this fairly large and probably representative sample it is found that, although in proportion to the increasing measured intelligence of the child the number of brothers and sisters steadily diminishes from about three and a half in the case of the lowest to one and a quarter in the case of the highest, there is no indication of any abnormally high fertility among the feeble-minded and very backward sections of the population. The conclusion is rather that persons of average and above average intelligence do not have enough children, and it may be that the deficit is in proportion to the amount by which intelligence exceeds the average. The death rate among low-grade children is higher than that among others, so that these results, combined with those of some investigations previously undertaken on somewhat different lines, do not vitiate the finding of a special committee of the British Medical Association in 1932 " that the average number of children who reach adolescence in families where one of the parents is feeble-minded does not significantly exceed that for the community as a whole."

Fifthly, mental deficiency is of multiple origin. In a considerable number of cases it is due to environmental causes, though in many of these it may be the pre-natal environment that is at fault. The common type of mongolian imbecility, for instance, appears to depend largely upon the age of the mother at the time of the pregnancy, so that it could be eradicated to a considerable extent if child-bearing were confined to the period between 20 and 30 years of age or so. Of those cases which are definitely hereditary only a very few show, in regard to their mental deficiency, the characteristics of genetic dominance. The great majority indicate dependence, not only on recessive genes, but on the coincidence of several such genes ; in that case it would require the sterilization of every mentally deficient person in every generation—an impossible proposition of course—for at least 2,000 years to produce any considerable effect on the incidence of mental deficiency. This is a fair example of the very limited eugenic effect of that method of selective maternity in all similar conditions in its application to large social groups.

Sixthly, whatever justification there may be—and there is much—for the voluntary sterilization of individuals in whom there is a high degree of probability of the handing on of a grave inheritable condition to a considerable proportion of their offspring (and every one of the adjectives I have used is intended to have full weight), there can be none for the sterilization of anyone on the ground alone that he or she is likely to be an imperfect parent. Which of us would escape? Yet this is one of the grounds recognized in the report of the Departmental Committee on Sterilization—perhaps the only really grave flaw in that report.

If all these and other relevant considerations are taken into account it will be seen that, at present at all events, it may be highly undesirable as well as very difficult to attempt to control the course of fertility in any selective direction through individual action. To my mind the whole campaign has been, and is being, conducted on wrong lines and in the wrong direction. Except in a few uncommon instances the effort to prevent the breeding of the unfit, or to enhance the value and supposed well-being of children by diminishing their number is mainly futile, or at least of secondary importance. It has, in addition, undoubtedly had other social consequences which are highly deleterious among the adolescent and young adult female population, and has been one of the major causes of the marked lowering of the reproduction rate and of the prevalent fear of maternity. The effort should be directed rather towards two other objects: the intensive study of the social (and possibly biological) factors affecting declining fertility (whatever they may be), and an attempt to suggest remedies for them ; and the creation of a social conscience towards maternity, especially among those sections of the community who are the more gifted in body and in mind. Obstacles to parenthood should be removed, and new incentives to maternity should be found. I hope it is not too late to begin.

Protection and Encouragement of Maternity

Maternity is thus a subject of prime importance, not only to the individual mother, but to society also. It may be the fulfilment of the highest function of a woman ; it is certainly the means of supplying society's most essential need. If society ought to encourage maternity it is equally society's duty to help to make maternity as safe as possible for the mother. It may be that it is also the duty of society to relieve maternity of some of its economic burdens, but on that aspect of the matter it is not my present business to dwell. In the more immediately important sphere of health we have to inquire how society can best perform its duty.

To answer this question aright we must first try to get a true view of the situation in this country. That situation has of late been seriously falsified in the public mind —not of malice aforethought, often with the best of motives, but ignorantly or inadvertently. It seems necessary to emphasize three general propositions.

The first is that maternity is an ordinary natural process which, although it involves delicate and complex organic and biochemical changes, is in the great majority of cases carried through safely and with complete success in every respect. Departures from the normal occur in a small proportion of cases only. The second is that in Great Britain as a whole maternal mortality compares favourably with that of almost all other countries ; and this is very markedly the case if we exclude three or four important areas in which that mortality is relatively high. The most important of such areas are the West Riding of Yorkshire, Lancashire, and Wales. Within these areas there are, as might be expected, some local government districts with an average low mortality, and there are a few towns outside those areas which, in curious local isolation, have a persistently high mortality rate ; but throughout the rest of the country, including London, the dangers of childbirth are as small as anywhere in the world.

The third point to remember is that the statement, which has been so commonly made since a Departmental Committee said something of the sort, that half the maternal deaths in this country are preventable is without any real significance as usually understood or interpreted. It may turn out to be—I hope it is—broadly true, for that would offer great hope ; but, stated dogmatically as an ascertained statistical fact, it will not survive critical examination. Based as it is upon the investigation of a number of individual maternal deaths, it has to be remembered that, however careful and thorough the inquiries may be, such investigation is in many cases necessarily very difficult and imperfect, and the inferences are correspondingly uncertain ; and that, as I shall indicate, some factors of undoubted importance which may have influenced the event have been left out of account altogether, attention having been directed solely to errors in the actual conduct of childbirth. Further, even if it be a fact that some significant error of judgement in the conduct of the case can be found by investigation after the event in approximately half the confinements which result in the death of the mother, the conclusion that 50 per cent. of the fatalities could be avoided is entirely illogical, since the other premise of the implied syllogism is demonstrably untrue. There are two such fallacies, either of which completely destroys the legitimacy of such a conclusion.

So long as human nature remains what it is it will never be possible to avoid every error of judgement on the part of every person concerned in childbirth, whether midwife, general medical practitioner, obstetrical specialist, the patient's friends, or the patient herself. Also, it is quite impossible to be sure in most cases that, if the discovered error of judgement had not been committed, the fatal result would necessarily have been escaped. For example, if the error were the non-removal to hospital at an early stage of a case that was seriously abnormal, who can say that the condition which proved fatal at home would not have had the same end after treatment in an institution? It cannot be reasonably asserted that appropriate treatment for any serious abnormality of pregnancy or parturition is invariably successful. Moreover, the stigmatized omissions or commissions found in the history of a case which are taken to classify it as " avoidable " are sometimes found in the history of other cases where there has not been a fatal issue.

One other point in this connexion is of sufficient importance to be worth mention. This specific statement as to preventability is often made in, and assumed to be applicable to, areas in which the rate of maternal mortality is already relatively low. Clearly it has no significance with regard to such an area. There the proportion in which it may be possible to reduce the rate may be quite small ; but it follows also that in areas where there is a high rate of mortality the reduction that must be aimed at is very much greater than the average indicated.

Such, then, being the true picture of the situation with regard to the safety or otherwise of maternity in this country there is no reason for panic or alarm, but there is every reason for anxiety and action. The death of a mother during the child-bearing period, with a child or children to look after, can never be anything but a dire disaster both individually and sociologically ; and the community, whether or no it actively encourages maternity on the one hand, is bound in duty to take every step which it can to make it safe on the other. To promote research into the causes of danger, to promulgate the results of such research, and to make adequate provision in every possible direction to reduce the danger to a minimum, are the obvious steps to be taken. As yet the community has done none of these things.

Lines of Research

Some years ago, when it became common knowledge, through the figures published in the annual reports of the Chief Medical Officer to the Ministry of Health, that there were these black spots in the country showing a persistently high maternal mortality rate, I urged that it was the obvious and immediate duty of the Ministry to inquire into the conditions which produced such a state of affairs in those areas. It was not, however, until last year that

an inquiry of this nature was set on foot. It is anticipated that the report of this inquiry will be published towards the end of the present year. I am speaking, therefore, under the condition that what I say may before long be subject to some modification or qualification in the light of the report.

Nevertheless, I confess that I have misgivings as to the scope and adequacy of that inquiry. I have some doubt as to whether the medical officers of the Ministry who are charged with it are fully equipped and fully empowered to pursue it as far as it should go. It is, indeed, very likely that important facts will be ascertained, that some imperfections in the practical application of clinical medicine will be discovered, and that some deficiencies of administration by public health authorities will be pointed out; but I cannot believe that in these special areas the skill and care of midwives, general medical practitioners, and obstetrical specialists are so different from that shown elsewhere, or the laxities of local administration are so peculiar as to afford an adequate explanation of the exceptional figures of maternal mortality. I cannot help suspecting that, however important such administrative and clinical factors may be, the main explanation may yet be found in those biological, physical, dietetic, sociological, even psychological factors which so far appear to have received insufficient attention. I can well believe that one or more of these might be found in such areas as Wales, Lancashire, and the West Riding, considered broadly, to differ significantly from those prevalent elsewhere.

At all events these factors are real, and are important enough to receive collective investigation. There is almost certainly a biological type of woman with whom there exists either an actual or a relative sterility or inability to carry through effectively the normal processes of maternity. It is known that the pituitary and other internal secretions are involved quite definitely in these processes, and that women in whom the quota of responsible hormones is imperfect or unbalanced will be relatively inefficient in the matter of having and raising babies. Physique, again, is probably a matter of prime importance. The sufficient and proper development of bone and muscle has an obvious bearing upon the safety of maternity. The low maternal mortality rate of Holland, Denmark, and Sweden has been attributed in large part to the superior physique of the women of these countries; it may be that the defects of physique which are—or at any rate were not long ago—much more prevalent in Wales and those parts of England that I have named, are not without a definite influence upon that rate in those areas.

During the past year or two the importance of nutrition in general and dietary in particular in this as in other spheres of health has been realized, and definite information has become available. The effects of inadequate diet upon the mother and on her offspring are manifold. It seems likely that a proper proportion of vitamin A in the diet of pregnant women will reduce the liability to puerperal infections, and it is certain that an adequate intake of other vitamins and certain minerals (calcium and phosphorus) may influence fertility, prevent the toxaemias of pregnancy, and promote the viability of the child, both in the womb and during the period of lactation. The diet actually required is simple, but relatively expensive for those of very limited means; but neither its importance for maternity nor its effect on maternal mortality is now open to question. In their degree, also, the psychological attitude of the mother and her friends towards motherhood, the extent to which fright may have been aroused, either by the propaganda for birth control or by exaggerated statements made in the course of a campaign for easy or for safe maternity, or the knowledge even that in her own neighbourhood the maternal mortality rate is, as a fact, unduly high, are in many cases not without their influence upon the outcome; while in some cases an obstinate refusal to take advantage of means of help publicly provided or otherwise available is an additional handicap.

Duty of the State

Now none of these things is, properly speaking, the prime responsibility of the medical profession, though that profession may be very helpful in elucidating and in applying or avoiding them. They are matters to be inquired into and dealt with by the community in general. It is of little use concentrating public attention upon supposed, or probable, or even actual deficiencies in the clinical conduct of maternity, and at the same time disregarding all the other factors upon which success in solving a difficult social problem may depend. Good obstetrics is, of course, the very first essential. That is the immediate, direct, and actual concern of the medical profession. The profession may be trusted to pursue its aim assiduously and persistently in every possible way, both educationally and in practice; indeed I know of no other body of persons that is competent to do this.

But it is the concern of society not only to take in hand those matters of which I have just been speaking, but, in addition and at once, to make available for every mother such a condition of things as to facilitate and encourage good obstetrics. Society has not yet done this. The State has tackled the problem of the provision of a national maternity service in a half-hearted, piecemeal, and mistaken fashion. It set up qualifications for a craft of midwives subject to somewhat expensive and not entirely effective supervision, and under the obligation to obtain the services of a general medical practitioner separately on each occasion on which any abnormality was observed; it forbade others than those so qualified to practise midwifery for gain. This system has proved so imperfect in several directions that a really drastic measure of reform has had to be passed by Parliament this year. The recent Midwives Act will radically alter the status of the generality of midwives, will reduce the number of those qualified to practise, will, it is hoped, materially improve their remuneration, will eliminate a number of those who do not pursue their calling as a serious means of livelihood but merely attend an occasional maternity case to secure a little pocket-money. In these ways it should do something to improve the practice and increase the experience of the remaining midwives, and should render their supervision more easy and adequate, but it is safe to say that by itself it will do but little to better the position of the individual mother.

The State further empowered and encouraged local authorities to establish clinics or centres for the examination of pregnant women and the giving of ante-natal advice. These have usually been under the direction of junior whole-time medical officers who have had little or no obstetrical experience and who either, in course of time, become experts within a very narrow range or soon leave this department of public health work for positions of wider usefulness. In some instances this arrangement is supplemented by opportunity for securing the advice of specialists in appropriate circumstances. Of recent years the State has facilitated the provision of hospital accommodation for maternity cases, but without placing any limitation upon the usage of this increased provision; many local authorities have provided such accommodation and have encouraged, or even offered financial inducements to, mothers to make use of it as an ordinary custom for normal confinements. There have, in addition to these major services, been one or two minor measures of a similar character.

Now I am not concerned to deny—indeed, I rejoice in the certainty—that these services, severally and collectively, have had a considerable, though limited, usefulness; but it has become clear that none of them has produced the effect for which it was designed, and that their total combined influence has not resulted in a reduction of the maternal mortality rate in this country. On the contrary, most disappointingly, the multiplication of ante-natal clinics and their greatly increased use by mothers during the last few years, and the much larger number of confinements that during the same period have

been conducted in hospitals in certain towns, have been accompanied by a rise in that rate. This is a significant fact—not, let me hasten to add, necessarily significant of any relationship of cause and effect, but as demonstrating that it is not upon these lines that we are likely to succeed in obtaining a much greater safety for motherhood.

It will be noted that each of these measures was taken by the State independently, almost in isolation, that there has been no unity, no necessary co-ordination, amongst them ; and it may be pointed out that most, if not all, of them have been put into administrative practice by a considerable number of important local authorities on mistaken lines—lines which were not inconsistent with certain popular or *a priori* beliefs or expectations, but which experience has now proved to be wrong or unwise. That experience conclusively shows that the social provision of a national maternity service is urgently necessary, and that it must be based upon the ideas of comprehensiveness and of continuity. It must be nation-wide in its application, and not subject in its essential features to the administrative vagaries of local political parties or the idiosyncrasies of particular medical officers of health or senior medical officers of maternity and infant welfare departments.

It is time to emphasize that we are speaking of the conduct of maternity and not merely of attendance at childbirth. This connotes supervision from the time that changes consequent upon conception first manifest themselves until the return to normal some short time after delivery. In this supervision the principle of continuity is an essential in a twofold way. It should be obvious that this whole period and event cannot be isolated from the rest of the health history and experience of the mother before, during, or after the actual pregnancy and parturition. Maternity is not to be regarded as an event in a woman's life marked off from all that has gone before or that is to come after. Not only should the medical responsibility for maternity be continuous with that for these other periods, but it should equally be continuous during the whole period of maternity itself. To have one person responsible for the ante-natal period, another for the confinement, and yet another for the post-natal period, as is so often the case under present arrangements, is always disadvantageous, and may be fatal.

In any national scheme continuity in these two respects should be embodied as an essential feature, and this can be achieved only by basing the scheme upon the family doctor or general medical practitioner. Continuous supervision of maternity as a whole must clearly be conducted almost always under domiciliary conditions. All available evidence (and there is much) demonstrates conclusively that normal confinements, and those which show only minor departures from the normal, can be and are conducted at least as safely at home as in a hospital ; curious as it may seem, it has been established as the result of more than one official inquiry directed to this point that there is no definite association between the maternal death rate and adverse home conditions. I add, as a matter of course, that serious abnormalities may require specialist aid and a hospital environment, but it is difficult to resist the conclusion (and why should we wish to do so?) that it is by the closer association of the general medical practitioner with maternity, rather than by his displacement, that progress will be made.

Medical Requirements during Maternity

In an important recent pronouncement by the British Medical Association the medical requirements of a woman during maternity are thus set out: " (1) Medical supervision *throughout* by the doctor of her choice, with specialist and hospital aids where needed. (2) Efficient nursing and advice by a skilled midwife or maternity nurse of her choice. (3) Provision of help in her house during the period of her actual incapacity. (4) Supply of dressings, special apparatus, or means of transport when required." " There are," it is added, " large numbers of women who can provide one or more or all of these requirements for themselves, but the Association is strongly of opinion that the State should see to it that, by some means or other, whether by an extension of the scheme of national health insurance or by the action of local health authorities, they should all be available for every mother."

I suggest that the time has now arrived when society should insist, and Parliament should enact in its next session, that a complete unified national service on such lines as these should be set up. Good obstetrics is now the common practice—not the exception—with the medical profession ; but the conduct of maternity is perhaps the most anxious and responsible of the departments of the doctor's work. It will still improve by research, by knowledge, and by training, but the provision through a social service of the helps and amenities just enumerated will not only add directly to the safety of the mother, but would ameliorate the conditions under which the doctor now only too often has to do that work. It would add also to the readiness and confidence with which he would undertake it, and so afford even a further security.

Summary

To sum up, I have submitted to you three major propositions. I will not formulate them in the order of their discussion, but will put them thus:

1. There are factors connected with fertility, maternity, and maternal mortality other than those clinical factors upon which attention has almost exclusively been concentrated and which are the prime business of the medical profession. These other factors it should be the business of the community to investigate, to assess, and to deal with.

2. The measures which the community has hitherto taken towards making maternity as safe as possible have not, in fact, accomplished that end. It has become urgently necessary to establish a complete national maternity service affording, on lines indicated by experience, all those conditions and aids which are essential to safe motherhood.

3. While agreeing that in a considerable number of cases individual advice as to the control of conception, temporary or permanent, may properly be given, the widespread propaganda directed towards birth control, sterilization, and the legalization of abortion is mistaken, and may lead to social and national disaster. It should be replaced by an educative campaign showing the individual and communal importance and value of motherhood, and especially by encouraging an increased reproduction rate among those of good stock and higher intelligence in all ranks of society.

I commend these propositions to you. I ask you to consider them ; if, after consideration, you approve, I beg you not to be content with an abstract or theoretical acquiescence, but to use all your influence with public opinion so that they may be translated into early and practical application.

A. Syssine (*Bull. Off. Internat. d'Hyg. Publique*, June 1936, p. 1101) states that during February and March, 1936, an extensive epidemic of influenza occurred in Soviet Russia, almost the whole country being affected. The largest number of cases were observed at the end of February and beginning of March, while after the middle of March there was a decline in their frequency. The highest figures were reached during the period of February 22nd to 27th, though the exact numbers have not yet been determined. In any case they were very high. At Moscow and Leningrad, for example, there were ten to fifteen thousand cases daily. Adults were more often attacked than children, and therefore it was not necessary to close the schools. The disease on the whole was mild, and severe cases were rare. The complications observed were otitis, bronchitis, and pyelitis. The measures taken to control the epidemic consisted in increasing the number of beds in the hospitals and of the doctors in the dispensaries and clinics, the establishment of daily consultations, and advice to patients to keep in bed until their recovery was complete.

MOTOR CARS FOR 1937

THE OLYMPIA SHOW

[FROM OUR MOTORING CORRESPONDENT]

Those who visited the thirtieth Annual International Motor Exhibition organized by the Society of Motor Manufacturers and Traders at Olympia (October 15th to 24th) will have found that since last year many alterations and improvements have been effected in the building. But this is the last Motor Show to be held at Olympia, as next year it will be held in the huge new exhibition building which is in course of erection at Earl's Court.

Some idea of the importance of the motor industry in this country may be gleaned from the fact that no fewer than twenty-nine different makes of British cars are to be seen; the names of twenty-seven of these are well known to the motoring public, and in addition one welcomes the reappearance of the Sunbeam, which has been off the market for a year or two, but which is now being manufactured in the London area, and a fully fledged four-wheel Morgan car made by the firm which has hitherto confined its attention to three-wheelers. The international character of the exhibition is also evidenced by the fact that there are nearly as many foreign makes as British to be seen, representing the leading motor productions of Canada, France, Germany, Italy, and the United States.

No Great Changes in Prices

Passing to a general review of the cars for 1937, it may be stated that mechanically, and in some cases entirely, they show very little change from those of the season just ended. Indeed, several manufacturers have announced that the former models are being continued practically unchanged. The same cannot, however, be said of the American cars, the external appearance of which is being altered in many ways. In fact, it would appear as if motor designers on the other side of the Atlantic are vying with each other as to who can introduce the most curious-looking car fronts, these being made in all manners of strange and unusual forms, the radiator grilles, of all shapes, having combined with them not only the head-lights and lamps, but the inner vallances of the front wings. The new forms have the disadvantage of reducing the accessibility of the engine and its adjuncts, such as the carburettor and ignition equipment, both of which need attention from time to time.

Notwithstanding the present extensive demand for steel and other materials for armaments, there is but little change in prices from those of the past season; some makers have been able to announce a slight reduction, and others have found it necessary to add a few pounds to the price. In view of numerous improvements in detail, full equipment, and generally more attractive finish, comfort, and appearance, the cars are, however, "better value for money" than ever.

It is hardly necessary to mention that the cars on view comprise models for every purse, from the £100 two- or four-seater to a floating Pullman costing over £3,000, with engine capacities ranging from 7-h.p. to round about 50-h.p. In a few cases makers are still offering two alternative sizes of engines at the same price, among them being the Standard, whose "Twelve" can at choice have a 10-h.p. engine, and one of the Vauxhall saloons, which can be furnished with either a 12-h.p. or 14-h.p. engine.

The New 14-h.p. Cars

Although, according to the taxation returns, cars of 8-h.p. and 10-h.p. continue to be the most popular—and it is remarkable the good account they are able to give of themselves—more attention is being paid to cars of from 14-h.p. to 20-h.p., a tendency which has resulted from the reduction of the annual tax in this country from £1 to 15s. per h.p., and one which should enable British manufacturers to compete better with American makers in our Colonies and in foreign markets generally. Indeed, one of the chief features of the new season's cars is the number of vehicles of 14-h.p. with comfortable seating accommodation for five passengers, and subject to an annual tax of only £10 10s. Some of these were introduced during the past summer and are being continued, among them being the Morris and Wolseley, while newcomers include the Austin, British Salmson, Lanchester, Standard, and Vauxhall. Other interesting new cars include the Alvis 17, the 14-h.p. and 20–25-h.p. Armstrong-Siddeley, the 10-h.p. B.S.A. Scout, the Citroën Family Fifteen, the Hillman Minx, the Humber Twelve, the Jowett "Flat Four," the reintroduced Riley Nine, the Rover Sixteen, the Singer 9-h.p. coupé on the Bantam chassis and the 12-h.p. saloon, the 25-h.p. Vauxhall, the Talbot Ten, and the 10.8-h.p. Triumph Gloria. There are also this year three noteworthy additions to the range of cars fitted with V-type engines—the 41.8-h.p. twelve-cylinder Lagonda, the 20-h.p. Standard, and the 22-h.p. Ford with eight cylinders, the last-named being offered at a very attractive price. Incidentally, it may be mentioned that the Ford vehicles are not displayed at Olympia, but at the company's own exhibition at the Albert Hall, Kensington, which also closes to-day (October 24th).

Many Improvements in Bodywork

The biggest improvements and changes are to be found in the bodywork. So far as British cars are concerned, what freakish ideas in the way of streamlining were introduced a couple of years ago have disappeared, and in their place we have attractive cars which slope slightly both forward in front of the engine bonnet and rearwards at the back, which in almost all cases now embodies an enclosed luggage boot and spare-wheel compartment. It will be observed, too, that engines are being placed slightly more forward in the chassis than in earlier years, enabling both the usual two ranges of seats to be brought between the axles, so ensuring more comfortable riding. Great improvement has also taken place in engine bonnets; formerly these were merely pieces of sheet metal with a few louvres formed in them, while to-day they are made to conform to the body lines and have artistic louvres, varying in form on different cars, but all adding to the attractive appearance of the complete vehicle.

Suiting Cars for Different Drivers

Although the saloon type of car continues in the ascendant, there are several new and neatly designed coupés for two or four passengers, the latter being chiefly of what is known as the drophead type, while for young and sporting motorists there is a bigger variety than ever of open cars. In the case of covered cars one is glad to find that increasing attention is being devoted to the important question of ventilation and absence of draughts, and to increasing the driver's vision, the latter being achieved by reducing the thickness of the body pillars at the two ends of the windscreen. The latter, by the way, as well as the windows, are now all of safety glass to comply with the requirements of the latest motoring regulations. As regards screens, the fitting of twin wipers has become the general practice. In not a few cases it must be stated that engine bonnets remain unduly high and front seats so low that the driver is not able to see the near-side wings, and therefore often drives and pulls up further away from the kerb than he otherwise would. Greater attention is, however, being paid to the question of suiting cars to drivers of different stature, evidence of this being afforded by more provision for the adjustment of driving seats and the height of the steering wheel, several car manufacturers now fitting as standard an easily adjustable telescopic steering pillar. One is glad to note, too, that endeavours are being made to do away with foot wells for the rear passengers, and to provide them with more leg room.

In the case of cars which are produced in large quantities, these are being offered in a wider variety of external

colours and also of interior upholstery, the latter being to-day generally of real leather, although cloth upholstery is being offered in some cases as an alternative. Where the motorist's financial resources permit, bodywork meeting individual requirements and tastes as regards both interior and exterior finish can be obtained, as a visit to the carriage-builders' section of the Exhibition will reveal.

Some Technical Details

Nowadays, when service stations are available in all districts where cars may be maintained in running order and anything that may go wrong quickly put right, medical men, and motorists generally, are not so greatly interested in the " innards " of cars as in the early days of motoring. There are still, however, large numbers who are technically minded, and for their benefit it may be mentioned that in the popular-priced range of cars the four-cylinder vertical engine prevails, although there is one vehicle, the Jowett, which still has either a two- or four-cylinder horizontal power unit. Cars of 12-h.p. and upwards usually have six cylinders, and for the larger class of vehicle there are engines with eight cylinders. Some years ago it was prophesied that engines with only four cylinders would be superseded by six-cylinder power units ; the prophecy has, however, not materialized into fact, for the " four " is as popular as ever, largely as the result of the attention which has been paid to the careful design and construction of such engines. As a matter of fact the *Autocar* estimates that the percentage of cars on the market with four-cylinder engines has increased since last year from 26.1 to 26.4—the highest proportion since the early days of motors. There is, however, evidence of the growing popularity of six-cylinder engines, their percentage having risen during the past twelve months from 50.6 to 53.3, an increase which has been achieved by a falling off in the number of vehicles with engines having eight or more cylinders.

Whatever the number of cylinders, engines show no radical departure from former practice, although several improved forms of carburettors have been introduced to facilitate starting in cold weather. Ignition by coil and distributor is now almost exclusively used, very few cars to-day being provided with magnetos. Other power unit improvements include an increasing use of air cleaners in conjunction with carburettors, and better filters in the lubricating-oil circulating system.

Centralized Chassis Lubrication

Several of the popular-priced cars are provided with three-speed gearboxes, but there are many which, like the majority of the larger vehicles, have four speeds. The synchromesh variety of sliding gears remains predominant, but the self-changing gear still finds its place for the ninth year in succession on the Armstrong-Siddeley cars, as well as on the Daimlers and Lanchesters, the last two also embodying what is known as a fluid flywheel. The special Hayes change-speed gear is available at an extra charge on some of the Austin models, and the de Normanville gear arrangement on the Humber vehicles. The Jowett Company, on its 10-h.p. car, has also adopted in connexion with the gearbox a device known as the Warren synchronizer, which provides a synchronized, quiet, and easy change on all gears. As to the free-wheel, although this still appears on a few cars, it has not met with general adoption. On the other hand, permanently fitted wheel jacks are being more widely used, and on a number of cars a centralized chassis lubrication system has been adopted —a useful idea, particularly when it is remembered that a few car designers continue to render it anything but easy for the owner-driver to reach points of the chassis which need the occasional application of the oilcan or grease gun ; and so, whether he wishes to do so or not, the car owner is compelled to have the work done at a service station possessing one of the modern car lifts. Brakes, whether hydraulic or mechanical—both varieties being used—have received attention with the object of increasing their effectiveness to meet the higher speeds at which cars are permitted to travel on unrestricted roads.

The Passing of the Wire Wheel

Front-wheel drive, while still adhered to by Citroën and on certain models of other car makers, does not reveal any progress, a propeller shaft and a spiral bevel or worm-driven back axle remaining the order of the day. Chassis frames are still of pressed steel, but are undergoing changes in the direction of using box instead of channel sections, with the object of securing greater rigidity. Springing is still chiefly by semi-elliptic springs, although independent front-wheel springing has been retained or adopted by a number of manufacturers. One of the most noticeable changes is in connexion with road wheels. For many years the wire-spoked type has been the most popular, but it is now largely superseded by what are known as easy-to-clean, pressed-steel, spoked-disk wheels, which are chiefly of small diameter and shod with a new type of extra-low-pressure tyre.

In next week's issue it is proposed to follow the usual plan of referring to some of the new car models, more especially those which are likely to appeal to medical men from the points of view of suitability and cost—the latter from the aspects of both purchase price and running expenses.

C. J. W.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY

[From a Correspondent]

The fourteenth meeting of the International Society of Medical Hydrology was held in Austria from October 10th to 15th. The English party of twenty-two members arrived at Innsbruck on the 10th in lovely sunshine, and with the exception of a council meeting and an extremely interesting demonstration of sections of joints from cases of osteo-arthritis and gout, by Professor Lang, the day was spent in sightseeing.

Spa Treatment and Old Age

On October 11th the congress was formally opened by Dr. E. P. Poulton, who introduced the president for the year, Professor Stasser of Austria. The latter then delivered his address, appealing for scientific exactitude in balneological research and more co-operation between clinician and research worker, particularly as the difficulties of animal and *in vitro* experiments were so great in this field.

A discussion on the spa treatment of the disorders of old age followed, the principal speakers being Sir Humphry Rolleston and Dr. v. Pap. Sir Humphry subdivided senescence into normal old age, old age complicated by disease, and premature senility. After mentioning the theories of the mechanism of old age, he spoke of the diseases particularly associated with it and its effect on the course of and immunity to certain others. Treatment should take the form of removal of noxious environment and alleviation of associated disease. Stimulative endocrinotherapy should play no part, as at best it would only cause a flash in the pan, followed by more rapid disintegration. Dr. v. Pap dealt with spa treatment. External applications might have far-reaching effects, as the skin was such an important organ. It had been called the third lung and third kidney. By means of warm baths and mud applications a valuable local hyperaemia might be produced, increasing oxidative processes and reducing pain. In cardiovascular cases carbon dioxide or other tepid baths combined with gentle massage were of great value, and metabolic disorders benefited greatly by baths in conjunction with diet and sulphate waters. In the various forms of rheumatism to which old age was so prone balneotherapy and physiotherapy were invaluable, and might be helpful in respiratory, paralytic, and skin disorders.

Visits to Spas

A visit was made to Bad Hall in the afternoon. This is a very interesting old town, with a small but modern saline spa, where the inhalatorium is a prominent feature. The next day the congress departed for Badgastein, stopping at Zell am See for lunch. Here they were met by the town band, which escorted a triumphal procession to the hotel, where lunch was served. The weather was kind, and the following morning this thermal radioactive spa was seen at its best. It is situated half-way up the mountain side, and all around was snow, but below in the valley the fields were still green. In this beautiful setting a discussion on radioactivity in medicinal waters was held. The experimental study of the effects of radioactivity in the laboratory is not wholly satisfactory, as idiosyncrasy depending on the state of the vegetative nervous system plays so large a part in clinical practice. An apparatus for the rapid estimation of the degree of radioactivity was described. Dr. Schulhof made an original communication on some important work on the Arneth count.

On Tuesday evening the congress was invited to a banquet and dinner by the municipality, and next morning a visit was made to Hofgastein before leaving for Salzburg. There the visitors were well entertained during a dinner given by the city by a fine exhibition of folk songs and dances in national costume. During the course of the congress papers were read on Italian spas by Dr. Rebucci, on plastic work in the treatment of rheumatoid arthritis by Dr. Kersley, on the properties and actions of various muds by Dr. Reichart, and on the effect of radioactive water in ovarian stimulations by Dr. Bravo.

The Teaching of Hydrology

Apart from scientific discussions, a report was received from the Peloids Committee on the classification of muds; a committee was formed to investigate climatic factors in spa treatment at inland and maritime resorts; and a resolution was passed dealing with the teaching of hydrology. This latter may be summarized in a recommendation that medical students be taught the elements of hydrology in general therapeutics and that visits to spa hospitals should be encouraged; that courses of post-graduate instruction be available; and that advanced study should be obtainable in at least one university in each country for those wishing to specialize in the subject. Under the term "hydrology" should be included the uses of medicinal waters internally and externally, accessory physical methods, exercises, manipulation, and climatology.

SMOKE ABATEMENT

THREE-DAY CONFERENCE IN LONDON

The National Smoke Abatement Society arranged a three-day conference at the Science Museum, South Kensington, opened by Captain H. Crookshank, M.P., Minister for Mines, on October 14th, and attended by representatives of nearly one hundred municipal authorities, the medical profession, and chemists and engineers. Mr. N. Bishop Harman and Dr. G. Clark Trotter represented the British Medical Association.

One of the six sessions of the conference was devoted to the effect of smoke on health, and another to public administration. Presiding over the first of these, Sir George Newman said that he had always been impressed by the almost disgraceful backwardness of this country in regard to the smoke nuisance and the neglect of its control. We were far more backward than we realized when compared with our neighbours across the Channel. Sir Leonard Hill, in a paper, described the effect upon health of the loss of sunlight by atmospheric pollution. The community had pure water, good drainage, and clean streets, now it must have clean air. The genial warmth and light of the sun, exposure to which increased the disease-resisting powers of the body, was lost by dirty habits. He also mentioned the action of dark heat rays. His research had shown that the air tubes of the lung were narrowed reflexly by way of the nerves when the skin was irradiated with dull red or dark sources of light. The effect was set aside by cooling the skin by means of a fan, and in many people also by rays from a bright source of heat.

Tuberculosis and Cancer

Sir Pendrill Varrier-Jones, discussing atmospheric pollution in relation to tuberculosis, quoted Jerome Meyers of the New York Department of Health, who said that while it was not claimed that smoke accounted for all cases of cancer, it was probably one of many causes or one manifestation through biochemical irritation of some great underlying cause as yet beyond our ken. Sir Pendrill wondered whether that factor was linked with the protective factor noted by Professor Lyle Cummins in relation to tuberculosis. An affirmative answer would not be inconsistent with the suggestion that so far from cancer and tuberculosis being two separate diseases, there was new evidence to show that they were so very closely related that it was unprofitable any longer to investigate one without reference to the other. He referred to some work undertaken by Dr. Barron Cruickshank, one of the research staff at Papworth, who had suggested that there might be a pathogenic bacteriophage which, after subduing tuberculosis, subsequently caused cancer. At the moment when the human organism was invaded by the tubercle bacillus this pathogenic phage might come into action, and by its success or non-success in lysing the tubercle bacillus, decide whether cancer or tuberculosis should supervene. This was only a hypothesis as yet. Many questions would need consideration if it were accepted. And was it possible that smoke was wholly or partially responsible for upsetting the symbiotic balance and thus activating the pathogenic phages? If so, the relation of atmospheric pollution to tuberculosis could not be discussed without considering at the same time its relation to cancer.

Sir Henry Gauvain spoke on light and clean air in relation to surgical tuberculosis. It was a common fallacy, he said, to imagine that where sun treatment was indicated the patient should necessarily be sent to a very sunny locality where there was intense and continuous sunshine of high actinic value. There were few countries where sun treatment might be afforded under more ideal conditions than the South of England in the spring and summer. At another session Dr. J. S. Owens, who has devised most of the instruments used for measuring atmospheric pollution, said that an examination of the air at some of our seaside resorts might be very enlightening. When such places grew into large towns the air which the inhabitants breathed was often no better than that of an inland city, and the case was worse owing to the concentration of invalids in the belief that they were getting sea air, whereas in fact it was only when the wind was blowing from the sea that they got anything but city air.

Administrative Problems

Presiding over a session for the discussion of public administration in relation to the smoke evil, Sir John Robertson referred to the good that could be done by personal approach to industrial smoke producers. When he was medical officer of health for Birmingham there were a large number of small works where the owners obtained power from a donkey boiler, or an annealing furnace, which was worse. The municipality approached the owners, pointing out that for annealing and certain other metallurgical processes it was possible to use gas; demonstrations were given, and those concerned were shown how the work could be done by means of gas as cheaply as with coal. Unfortunately, no records were kept of the results, but there was no doubt that the atmo-

sphere of the manufacturing area of the city was much improved as a consequence of such action. He believed that the majority of manufacturers were desirous of preventing smoke if only they were told how it could be done. The real cause of the trouble was the country's splendid supply of soft coal.

Dr. A. S. M. Macgregor, medical officer of health for Glasgow, described the powers of local authorities in efforts to reduce the smoke nuisance. In administering the law for the control of industrial smoke emission it was necessary to set up standards on which to work. In Glasgow, by resolution of the corporation, the standard adopted for prosecution was two minutes or over of dense smoke in any observation not exceeding sixty minutes. In England and Wales, of the 191 local authorities possessing by-laws, the standard in 111 was a two-minute period in the half-hour, and in the remaining eighty a three-minute period of black smoke. In most large industrial areas the local authorities arranged for the measurement of impurities in and deposited from the air to be made by means of smoke gauges or air filters. These local observations were valuable for many reasons ; they enabled the rate of progress of smoke abatement to be judged from year to year, while the statistical and pictorial evidence of pollution were useful material for propaganda. It was, moreover, important for each area to know for practical purposes, with the aid of consistent records, just what its problem was.

Dr. R. Veitch Clark, medical officer of health, Manchester, pointed out the value of large administrative areas for this purpose, such as the area of Sheffield, Rotherham, and district, embracing 133 square miles. The administration of smoke law should not remain in the hands of individual local authorities, but should be vested in joint statutory boards covering wide areas. Through the regional Smoke Abatement Advisory Committee in South-East Lancashire observations had been made, with the result that it was found that in areas where, for various reasons, control of smoke was not practicable, there was 33½ times as much smoke as where control could be exercised. The smaller local authorities were unable, for financial reasons, to administer the smoke law, when the appointment of the necessary official would involve an undue burden on the rates, but such administration was easily possible, with a negligible burden on any authority, when it was spread over a wide area. He added that observations carried out in Manchester for more than five years showed that the average daylight incidence there—ordinary daylight, not sunlight—was only 55 per cent. of what it was eight miles from the centre of the city.

The Domestic Smoke Problem

On the domestic smoke problem Dr. Margaret Fishenden had some interesting things to say. Smoke abatement enthusiasts had asserted that coal grates should be abolished by law ; this was not feasible except over a long period of years. Forty million tons of raw coal were burned annually in domestic grates, and to replace this by gas and coke gasworks capacity would have to be trebled—not a thing that could be done in a year or so. The extended use of gas, coke, and electricity should be given every encouragement, but in the meantime something must be done to reduce smoke emission from coal grates. Among the natural smokeless fuels (anthracites) and the manufactured smokeless fuels (cokes) a smokeless substitute could always be found at little extra cost, sometimes at lower cost. Even where bituminous coal was used, smoke emission could be cut down by care in lighting the fire and in adding coal.

An exhibition was arranged concurrently with the conference, of which some notice appeared in our issue of October 10th (p. 725).

At the society's dinner on October 16th a presentation was made to the president, Dr. H. A. des Voeux, in recognition of his long-continued efforts for smoke abatement.

THE LONDON MEDICAL EXHIBITION

The London Medical Exhibition, which was arranged from Monday to Friday of this week in the new hall of the Royal Horticultural Society at Westminster, attracted about one hundred and twenty firms, who displayed a wide range of products for the service of the medical profession. About two-thirds of the exhibitors were represented at the exhibition held in connexion with the recent Annual Meeting of the British Medical Association at Oxford, and to give any extended review would be only to repeat what was written on that occasion. The exhibition as a whole presented a very pleasing appearance.

Some Exhibits in Brief

Although there were many stands devoted to surgical instruments and appliances, it was drug products which seemed to dominate the exhibition. Immediately on entering, the visitor was confronted with six large stands, one at the top of each of the aisles, bearing the names of Burroughs Wellcome, Parke Davis, British Drug Houses, Allen and Hanburys, Boots, and the American firm of Eli Lilly. Burroughs Wellcome, among their latest introductions, showed a viper venom haemostatic, also a preparation consisting of the vitamin-containing fraction of rice polishings, for the treatment of vitamin B_1 deficiency ; Parke Davis had a new arsenical compound for intravenous injection in the treatment of syphilis ; Allen and Hanburys showed magnesium-synergized aspirin tablets, and British Drug Houses the active haematopoietic principle of liver in sterile solution for routine treatment. We mention these stands merely because they happened to be the first seen, but there were fifty or sixty others on which the products of the chemical and pharmaceutical laboratory were shown.

Among instruments was a micro-dynameter galvanometer, which was claimed to be of value in the localization of septic foci. Short-wave diathermy machines, producing wave-lengths of from six to fifteen metres, were exhibited ; also a portable *x*-ray outfit, in which the tube and transformer were contained in a single casing ten inches long. The roll of motor casualties perhaps accounts for the ingenuity which still exercises itself over the artificial limb. Thus there were shown a model of limb for above-knee amputation, fitted with a special knee mechanism, enabling the patient to walk with a natural knee-swinging action, a below-knee artificial leg, having a socket entirely unaffected by heat or moisture, and an exceptionally light steel-arm crutch, especially suitable for ladies. More than one stand showed improvements in syringe mechanism. In one device, with the cartridge type of syringe, the cartridges were automatically ejected into a convenient position for removal. At one stand as many as twenty different applicators for applying heat into body cavities were on view.

The spas were rather more technical in their exhibits than usual, Harrogate showing capillary photographs to illustrate the peripheral circulation in rheumatic conditions, and Buxton giving illustrations of a deep-pool bath for manipulative exercise and massage under water. Half a dozen bookstalls added to the interest of the exhibition.

A wireless base, with which thirty lonely stations in Kimberley will be in touch, was recently opened at Wyndham, Western Australia, as part of the Australian Aerial Medical Services. Dr. Allan Vickers, in a paper on the Australian Aerial Medical Services read before the Section of Medical Sociology at the Annual Meeting of the British Medical Association at Melbourne last year (*Supplement*, February 1st, 1936), referred to the early establishment of this base at Wyndham on the lines of the one already so successfully operating at Cloncurry, Queensland. The cost of the Wyndham base has been largely defrayed by members of the Victoria Section of the A.A.M.S.

Reports of Societies

RADIOLOGY'S CONTRIBUTION TO THE CANCER PROBLEM

At the first sessional meeting of the Section of Radiology of the Royal Society of Medicine on October 16th Dr. J. H. DOUGLAS WEBSTER, the president, delivered his address from the chair, and took occasion to discuss comprehensively the contribution of radiology to the cancer problem. Dr. Webster's address, which owing to pressure of time was only read in part, was an elaborate survey of international literature bearing upon the question in its experimental, diagnostic, therapeutic, and educational aspects. He also entered upon some general discussion of the theories of cancer origin and on the possibility of a hereditary factor. In touching on the theory of a virus disease, he mentioned that in some twenty-five to thirty-five breast cases he had seen attacks of herpes zoster, which was a virus disease, closely associated with varicella. What relationship, if any, there might be between that and malignancy he did not know. With regard to experimental radiology and the need for correlation with the results of clinical radiotherapy, he said that the problem had so many aspects that experimental radiology seemed a subject worthy of the establishment of professorial chairs.

Diagnostic and Therapeutic Radiology

In discussing diagnostic radiology Dr. Webster said that this was an auxiliary specialty which was of the greatest aid in dealing with cancer in special sites. In cancer of the stomach, as in most other cancers, the secret of success was early diagnosis. If carcinoma was present, restriction of diet, change of scene, and administration of drugs would bring relief for a short time ; but it was not relief that was wanted, it was knowledge, and, as the late Lord Moynihan had said, the real inquiry centred on the radiologist. Diagnosis seemed to be really difficult in about 10 per cent. of the cases ; many of these were at the cardiac end of the stomach. It was well to suggest to the clinician that in the event of an apparently negative result the whole alimentary tract should be examined.

Turning to therapeutic aspects, he referred to the increase in the number of cases in which radiology was either employed alone or combined with surgery. At the Middlesex Hospital in 1925 the cases so treated numbered 297 ; in 1935 the number had risen to 453. Radiotherapy was not only a local treatment, but, as recent studies had suggested, it was a general treatment for malignant disease (treatment of the ovary or pituitary, locally or by teleroentgentherapy), and it appeared to offer good possibilities in certain given conditions. Advances in institutions and organization had also been noteworthy. He referred in particular to the new radiumhemmet in Stockholm, which he had recently visited.

Recognition of Early Cancer

The last part of Dr. Webster's address dealt with the education of medical students and practitioners in cancer diagnosis and possibilities of treatment, especially in the recognition of early cancer. The main problem seemed to be the education of the general practitioner in the recognition of early cancer. It was not generally recognized that in most Western countries the proportion was not more than about two cancer patients to each practitioner a year. Therefore, without special instruction, how could the practitioner be expected to recognize the disease, especially in the early stages? In educating the public care had to be taken to avoid encouraging morbid fears. The best thing was public education in the insurance value of periodical medical examinations. It had been said that there were four stages of delay: the clinically latent period ; the period during which the patient delayed seeking medical advice, owing to lack of means, anxiety, or natural indolence ; the delay due to the first practitioner consulted and the symptomatic treatment he probably instituted ; and the delay, after definite recognition of the disease, in instituting operative or radiotherapeutic treatment. Until there was a reduction in these three last periods of delay no marked diminution in cancer mortality could be expected.

RAW VEGETABLE DIET IN CHRONIC RHEUMATISM

In her presidential address to the Section of Therapeutics and Pharmacology on October 13th, Dr. DOROTHY C. HARE described a clinical trial of the effect of a raw fruit and vegetable diet in chronic rheumatic conditions.

The trial was made on twelve patients, and the conditions included muscular rheumatism without arthritis, muscular rheumatism with synovitis, osteo-arthritis, and rheumatoid arthritis. The rheumatoid arthritis cases included a very early case, severe active cases, and old-standing cases. Other methods of treatment were excluded so far as possible. The diet regime was divided into two periods. Diet I was a vegetarian diet of fresh and dried fruits, salads, shredded roots, and salad oil, with a small milk and cream ration, no cooked foods, and no added salt. It was very low in protein and in sodium. The calorie value was about 2,000. After two weeks Diet II was given, being practically the same diet with the addition of small amounts of meat and other cooked foods, and containing rather more sodium. The concentrated carbohydrate foods were strictly limited.

Clinical Results

Dr. Hare reported in detail the results in the twelve cases. Symptoms of pain and stiffness were relieved in ten cases, the improvement beginning within a few days and continuing during the stay in hospital. The cases of muscular rheumatism and synovitis showed the greatest improvement. In osteo-arthritis of the hip the pain was relieved, but relapses had since occurred. In two bedridden cases of rheumatoid arthritis, pain was relieved and the patients were able to stand after five or six weeks, but here again relapses followed and the toxic symptoms were not improved. In one of these cases the diet had to be discontinued ; the other case was still on the diet and progressing slowly. Two old-standing cases of arthritis were not relieved.

After showing cinematograph records of the patients, Dr. Hare discussed the results of this therapeutic trial. She considered the principal factor in producing the favourable results to be the low sodium content of the diet. The body weight fell rapidly in all cases during the first week of treatment and was then stationary. The loss of weight was due to loss of fluid, and resembled the dehydrating effect of other "salt-free" regimes. Some forms of chronic rheumatism were associated with abnormal retention of fluid—that is, low-grade tissue oedema—and the relief of pain, stiffness, and synovial effusions was the direct result of the dehydration. Pain caused by active joint disease and symptoms due to toxaemia were not influenced. The effect of other factors in the diet could not be excluded, and needed further investigation. A diet of fruits and vegetables, either raw or cooked by steaming, or in casserole without salt, provided a low sodium intake which was varied, palatable, and rich in vitamins. An adequate supplement of protein and fat was essential for continued use.

Dr. Hare added that the value of diets in the treatment of chronic rheumatism was not widely recognized by the medical profession in this country and was regarded as a popular fad. It was to be hoped that with a better understanding of the action of such diets this treatment would be afforded to cases with muscular rheumatism or synovial effusions and such arthritis cases as had muscular pains and might be expected to derive benefit on the lines suggested.

PROBLEMS OF DELINQUENCY

The annual conference of the psychological group of the Medical Women's Federation was held at Sheffield University on October 3rd, under the presidency of Dr. DORIS ODLUM, the subject for discussion being "Delinquency."

Dr. HELEN BOYLE made an appeal for the psychological examination of all first offenders and a psychological assessment of their delinquency or crime in addition to what was undertaken by the law, such investigation to be obligatory in the case of child offenders and optional in the case of adults. She pointed out that the same crime as committed by different persons was not the outcome of the same causes. Thus, delinquency might be an expression of incipient brain disease, of mental defect and retardation, of reaction to intolerable emotional situations, or of sheer lack of normal outlet in otherwise normal children. Under the present system a person might be convicted a number of times before certain underlying psychological necessities for his conduct were laid bare. This involved recurrent expense to society which timely psychological investigation would have saved. Out of 39,000 convictions, 28,000 of the offenders had been previously convicted. To safeguard society from recurrences was a prophylactic measure of the first importance in the problem of criminality.

In the discussion which followed Dr. HELEN WILSON mentioned the increasing number of cases (such as those concerned with minor motoring offences) which hardly seemed to warrant so sweeping a recommendation as psychological examination of all first offenders. Dr. ELEANOR CREAK sounded a note of warning when she said that "ten minutes with a psychiatrist" was not to be considered an adequate way of dealing with the problem, since nothing but a very thorough investigation could be of practical use.

Factors Concerned

Dr. F. E. E. SCHNEIDER gave an analysis of the factors making for delinquency; the causes, he said, no one knew. These factors he classified as endogenous and exogenous. The endogenous included heredity, mental deficiency, mental disorder, and bodily ailments. Statistics concerning heredity factors were unreliable, but mental deficiency played a very important part in delinquency. A group of case histories pointed to a definite connexion between such physical disorders as pulmonary tuberculosis and delinquency with general intractability, while the post-encephalitic was subject to a type of behaviour readily recognizable by all who came in close contact with him. An important point about epidemic encephalitis was that the victim of this disease might get into the hands of the police without it being suspected that he had ever had an attack. Experience at Rampton State Institution showed that the after-effects might not declare themselves for twelve years or more after the acute attack. Exogenous factors might be grouped under the varying environmental situations comprised by the home, the school, the street, and the workshop. School could be regarded as the first line of defence against delinquency, and it seemed desirable that there should be a better classification of school children. A fact which had never been satisfactorily explained was the greater frequency of delinquency among males than among females.

In the subsequent discussion Professor A. E. NAISH pointed out the extraordinary difficulty of deciding upon cases of borderline mental deficiency and the difficulty of dealing with these cases whichever way one's decision tended. Dr. SCHNEIDER then amplified an earlier statement that what was needed was a school (or even only a class in a school) for delinquents, intermediate in standard between the ordinary and the special school, where their needs could be more adequately met than was at present possible. Dr. BARTON HALL said that in her experience it was comparatively rare to meet with delinquents having parents with criminal records, but associated factors were frequently alcoholism, marital infidelity, and the disrupted home. One reason for the difference in the numbers of female as compared with male offenders was that up to the present at any rate the home had been the focus of the girl, both as child and as adolescent, claiming her interest and her spare time, while the wider sphere of activity and greater adventuresomeness of the boy and youth provided him with many more opportunities of coming into conflict with the law.

The American Method

Dr. ELIZABETH BUNBURY, in an interesting paper on the American approach to the problem of delinquency, pointed out the vastness of the American field (there were 400,000 known criminals in the United States, and this figure represented only about 8 per cent. of those engaged in crime), and emphasized the fact that they made a beginning where the beginning logically lay—namely, with the child delinquent. Comparatively little was done for the adult in a preventive way, though reclamation methods were adopted in certain States. In its dealings with children's cases the American system tended to be more flexible than ours, was less tinged with officialism, and provided time and opportunity for a very thorough investigation. On the whole, investigation in America outstripped therapy, but important advances were being made. The most encouraging factor was an increasing realization on the part of the community of its corporate responsibility for the delinquent and criminal member, and of the need for treatment rather than punishment. Prisons must be regarded as a confession of failure on the part of society, gradually to be eliminated as our attitude towards those concerned grew more effective and responsible.

Scotland

Endowment of Medical Research at Glasgow

Sir Frederick Gardiner has given £10,000 to Glasgow University towards the provision of a medical institute to be erected in connexion with the Western Infirmary and to be called the Gardiner Medical Institute. This is to be at the disposal of the professor of the practice of medicine for teaching and research purposes. A further £10,000 has already been allocated by the trustees of his brother, the late Mr. William Guthrie Gardiner, for the same purpose out of the residue of his trust estate.

Tuberculosis in Greenock

In his annual report for 1935 on the health of the burgh of Greenock, Dr. Alexander Johnstone, medical officer of health, discusses at some length the progress made in diminishing the incidence and mortality of tuberculosis, in both of which there has been a steady decrease for some years. The death rate shows a more marked decline than the incidence, the efficiency of treatment having surpassed that of preventive measures. It is remarked that although there is as yet no one specific cure for this disease the combination of methods used in the treatment of its various manifestations is steadily increasing the number of years of useful life which may be expected by tuberculous patients. Isolation of every infective case is not at present possible owing to legislative, economic, and social impediments, and it is best at present to concentrate attention on the child, examining contact cases more particularly and supervising them for long periods. In 1935 the pulmonary tuberculosis death rate was 0.76, comparing with 0.79 in 1934, and 0.82 the average rate for the last five years. The non-pulmonary rate was 0.09, which was markedly below that for 1934 (0.21), and still further below the previous quinquennial average of 0.27. The total tuberculosis death rate was 0.85, which was below the 1934 figure of 1.0 and the quinquennial average of 1.09; all these low rates in 1935 were records. Dr. Johnstone compares the rates in 1935 and 1911; the latter year was the one before the inception of organized anti-tuberculosis measures in Scotland. The general death rate was then 18.44, and it had fallen in 1935 to 13.85, a reduction of 24.9 per

cent.; the total death rate for tuberculosis fell in the same period from 2.45 to 0.85, a reduction of 65.3 per cent., which suggests that additional life-preserving factors had been at work in respect of tuberculosis. It is computed that 128 lives may be considered to have been saved in 1935 in Greenock by the operation of these factors.

Royal Medical Society of Edinburgh

Lord Horder gave the address inaugurating the new session of the Royal Medical Society of Edinburgh in the hall of the society on October 16th, when Dr. A. N. M'Farlan, the senior president, was in the chair. Discussing the relation of the doctor to general happiness, Lord Horder said that there was a collective state of contentment just as there was a collective state of physical health somewhat akin to what in the financial world was called "confidence," a basic feeling that made for prosperity. He believed that the doctor was an important factor in the preservation of this happiness. The recognition of the importance of the psychological factor in disease and treatment was as old as Hippocrates, but the introduction of psychology as a compulsory subject in the medical curriculum was long overdue. He had striven for this during several years, and had held that if the curriculum was already too full some of it might be usefully omitted to make room for psychology. Anxiety states entered into a large number of diseases, organic as well as functional, and few would deny that happiness, whatever its ingredients, was a large factor in preventing disease. The doctor should therefore interest himself in the patient's happiness and give the best guidance to ensure and to maintain it. He visualized the Ministry of Health as a Ministry of Public Happiness. It was of paramount importance, however, that doctors should remain detached from the general clamour of the left and the right. The position facing them was appallingly, transparently, and unpalatably simple. He would state the desiderata in terms that were clear though crude. First, enough of the right food, but it was no use telling people to drink more milk if they could not get it. At present milk cost 2d. a gallon for making walking-stick handles, and 10d. a gallon for human food, and the problem of distribution must be tackled. Secondly, there was easy access to the fresh air, and thirdly shelter, but shelter at a rent which would leave something with which to buy food. The rich and the notorious had nervous breakdowns from which they had means of escape, while the poor and those nearly poor might long no less at times to escape, but the door was often barred against them. There should be leisure for people, and the giving to each human being of a chance, even before he was born. With regard to physical training, Lord Horder said that they should be clear about the meaning of this term. It did not mean merely drill and putting on uniforms with parades. He suggested that it should be an effort carried out on well-controlled principles to raise the general level of physical fitness by disciplining the body and so encouraging a healthy mind in a happy citizen. They should thus attempt to secure physical fitness and happiness for the people of this country so that they would preserve their mental poise when large sections of humanity were losing it. This mental poise might save civilization, but if a national hysteria or a national hypochondriasis were developed, this unique opportunity might be lost for ever.

England and Wales

Maternity Hospital Opened at Luton

Sir Comyns Berkeley's Address

A well-planned maternity hospital has just been built by the borough council of Luton. It stands on high ground a little way out of the town, clear of any buildings which would prevent the access of sunlight into the wards. The labour and operating theatre form a well-defined unit with an anaesthetic and sterilizing room separating them, but communicating. The hospital, which includes an isolation block, was opened by Sir Comyns Berkeley, who said that one of his duties was to inspect maternity hospitals all over England, and that for its size he had not seen one to beat the hospital at Luton. Sir Comyns Berkeley went on to discuss the question of propaganda directed to the prevention of maternal mortality. The object of such propaganda was or should be, he said, not to frighten women, but first to reassure them that in the vast majority of cases childbirth was a physiological process and devoid of danger, and secondly, to impress on pregnant women who were ignorant and careless that if only they would take an intelligent interest in their condition many of the complications of childbirth could be eliminated. He called attention to the statistics of the Registrar-General, from which it appeared that 1.95 per 1,000 deaths were due to puerperal sepsis, and 2.46 per 1,000 to other causes. These two classes, he said, should be carefully separated by those who felt called upon to criticize the present situation, and not be combined in the single statement that the maternal mortality rate was nearly 4.5 per 1,000, which unfairly implied that the lack of improvement was due to circumstances that could be rectified. Of the deaths under "other causes" 20 per cent. were due to a complication the cause of which at present was unknown, and an almost equal proportion to complications that no doctor was able to prevent. Of the remainder in this class it was true that many of the women could be saved by a more efficient supervision of pregnancy, labour, and the puerperium, but by no means all, however careful the supervision and however expert the medical attendant. As for puerperal sepsis, this was the outstanding factor in the death rate, and when the importance of the more recent researches was fully realized by members of the medical profession, when all local authorities availed themselves of the facilities which were within their power, and when the Midwives Act became fully effective, there could be no doubt that the percentage of deaths from this cause would be reduced. The speaker went on to cite the various safeguarding factors—the new Midwives Act, which might appropriately be termed the mothers' charter, the new rules and regulations of the Central Midwives Board, the institution of the diploma, now being taken by a large number of medically qualified men and women, of the British College of Obstetricians and Gynaecologists, and the increasing exercise of their powers by local authorities. He outlined what could be done within the province of such authorities—the setting up of ante-natal centres, the establishment of a consultative centre at a thoroughly equipped hospital, the appointment of area consultants with special experience in midwifery and diseases of women, and finally the provision of maternity beds. On the assumption that their surroundings were adequate and that the professional attention they received was efficient, the best place for most women to be confined was in their own homes, and in such circumstances normal confinements could be satisfactorily and safely conducted. But when such services were not available, and for certain cases detected ante-natally, and for abnormal labours, adequate hospital accommodation was essential. Finally, each hospital should have a "flying squad" in the form of a complete organization for dealing with those patients who were too ill or too far away to be transferred with any safety from their homes. He praised the borough of Luton for its enterprise in respect of its maternity and other health services.

Durham University Organization

The commissioners appointed under the University of Durham Act, 1935, have formulated the second draft of the proposed statutes for the University. The first draft was issued in the early part of the present year,[1] when

[1] *British Medical Journal*, February 8th, 1936, p. 275.

it was announced that the commissioners would be prepared to receive and consider any representations made to them. The second draft follows very closely the lines of the first. One change is in the proposed constitution of the Newcastle council. It will be remembered that the statutes make the University a body corporate with two divisions—namely, the Durham Division, comprising the eight Durham colleges, and the Newcastle Division, comprising the College of Medicine and Armstrong College. The Newcastle council, under the second draft, will consist of the rector, the sub-dean, and the dean of medicine, six members appointed by the academic board of the Division, one each by the Royal College of Physicians of London, the Royal College of Surgeons of England, the General Medical Council, and two engineering institutions, five members representing the associated hospitals, and seven the local authorities—namely, the municipalities of Newcastle and Gateshead, and the Northumberland County Council. There are also to be not fewer than twelve or more than twenty-one co-optative members, and the first co-optative members are to be appointed up to the maximum figure, seven by the existing council of the College of Medicine and fourteen by the existing council of Armstrong College. This differs from the proposals in the original draft, wherein the council was to include six members appointed in the first instance by the College of Medicine, twelve by Armstrong College, six by the local authorities, and five by the associated hospitals, and there was no provision for the representation of the Royal Colleges or the General Medical Council. Each year for seven years one of the College of Medicine representatives and two of the Armstrong College representatives will retire. It is laid down that none of the members appointed to the proposed council shall be full-time teachers or salaried officers in the University. The hope is expressed that these statutes as now presented will need no variation, though a certain time is allowed before they go to the Privy Council for approval.

Surgical Instrument Makers at Dinner

The annual dinner of the Surgical Instrument Manufacturers Association (Incorporated) took place at the Holborn Restaurant on October 16th. Mr. H. Guy Drew (who is only the fourth president in the history of the association, which now extends over twenty years) presided over a large company of members and guests. The health of the association and its president was proposed by Mr. N. St. J. G. D. Buxton, who commended those concerned on the training requirements and the ethical code which have been established. The manufacture of surgical instruments and appliances was one which called continuously for research, especially such research as was now proceeding on new metals capable of being employed in surgery. The craft was of the utmost value to those practising surgery, and it had this further, sometimes unconsidered value, that when, as often happened, the surgeon conceived a bright idea for some new instrument or modification and took it to the instrument maker, the latter from his intimate knowledge of history was able to tell him that he had been forestalled, probably quite in the early days of surgical instrument making. The closer the association between the surgeon and the maker of his instruments the better. Senior members of the craft had had the opportunity of watching surgeons at work, and understood their preferences and antipathies for certain kinds of instruments. Mr. Drew, in reply, praised the British craftsman, the product of the learner and apprenticeship system. In a thousand years' time, when the relics of this civilization were on exhibition, it would not be, as with the civilizations of the past, its pottery and the like that would be chiefly admired, but its wonderful work in steel, among which the surgical tool would have pride of place. As for the association, he described it as the child of necessity. Every year it had to face new problems, and the committee was kept very closely engaged. He spoke of the industry with pride as one of the essential industries of the country. The products of many larger industries could, at a pinch, be done without, but lives depended every day upon the surgeon, and the surgeon's skill depended largely upon his weapons and the care and experience which lay behind their manufacture. Were it not for this auxiliary, surgery would not be the progressive thing it was. The toast of "The Guests and the Ladies" was proposed by Dr. A. N. Gardner, and responded to by Lieut.-Colonel W. Parkes.

Dietary Surveys in Rural Areas

Dietary surveys are to be carried out in certain rural areas by local authorities on behalf of the Ministry of Health. These surveys will supply the Advisory Committee on Nutrition, which was appointed last year (*Journal*, June 8th, 1935, p. 1187), with information essential to its inquiry into the diet of the people. The Minister of Health is communicating with the local authorities concerned, asking them to undertake surveys covering a selection of families in their areas. All expenses incurred in carrying out this work will be refunded by the Ministry of Health.

CORRESPONDENCE

A Bureau of Geographical Medicine

SIR,—Here is an opportunity for a millionaire—a dream that might come true. Clinicians must long have been tantalized by reading isolated observations by some isolated doctor such as "The cultured Chinese never suffer from high blood pressure"; or "The African tribes among whom I practise never have cancer, which I conclude is a matter of diet"; or "Appendicitis is absent from my part of the world." The clinician longs to find out if such statements are well founded and to obtain proper statistics, and by comparing and contrasting the same common disease in different parts of the world to find out what makes it scarce or common, and hence a way to defeat that disease. At present he has no means of doing so. Darwin used to write personal letters to naturalists all over the world for extracting illuminating information.

The Central Bureau of Geographical Medicine of my dreams could do this on a vast scale, and co-ordinate and digest the knowledge gained. It would be a laboratory without a single test tube: a factory where dead facts are assembled into living, growing knowledge. The cost would be great but the reward greater. Aided by such a bureau, lonely doctors in remote districts would feel encouraged and inspired when their unique observations were no longer wasted but were collated and made fertile. After they had done good and reliable work for the bureau they could be elected co-operators—a title which would be valued. Sir Robert McCarrison, in his Cantor Lectures on Dietetics (*British Medical Journal*, February 29th, 1936), compares the incidence of diseases in the Punjab and in the Madras districts. In the latter area "stomach ulcers were nearly sixty times more common, rheumatism five times as common, and cancer three and a half times as frequent." He attributes this all to diet, but evidently we need confirmation by comparison with other and colder climates. No one knows the cause of peptic ulcer, and yet the truth must be tangled up in those amazing figures: it needs disentangling.

Then, in the field of medical psychology, I read that the Turkish soldier never suffered from shell-shock. Is this true, and why? Theoretically, the confessional should reduce nervous diseases in Roman Catholic countries. Is this so? Some races (the Japanese) regard sex as a cold-blooded and sinless necessity and prostitution as moral, so that in Japan sex seems unlikely to produce conflict and neurosis as it does in Freudian countries. Evidently the field of inquiry is immense, and perhaps at first should be limited. If the business interests of our millionaire were world-wide it would be helpful. The

British Empire is an ideal field for investigation—with every climate and one connecting language.

The British Medical Association—"jam latissime patens"—is the obvious organization to aid and abet the bureau, especially by starting a Section of Geographical Medicine at its Annual Meetings, where distant doctors could meet and discuss papers. Also in and around London there must be many leisured doctors retired from the Empire or Services who would be glad to help at the bureau. Besides clerks and librarians, there would be needed a few directors of the various types of mind—administrative, statistical, interpretative, and encyclopaedic. Its journal should have a world-wide sale. In originating the building, office organization, and personnel the administrative talents of our millionaire could have full scope. A great project of this kind is so much everybody's business that it becomes nobody's business. Hence these adumbrations.—I am, etc.,

Hull, Oct. 19th. F. C. Eve, M.D., F.R.C.P.

Plastic Operations for Hydronephrosis

Sir,—I was surprised to read in an article on plastic operations for hydronephrosis by Mr. Hamilton Bailey in your issue of October 3rd that plastic procedures on the pelvic-ureteral junction in this country had been given up. I take it that he also refers to the reduction of the renal pelvis by removal of a portion of the wall in hydronephrosis, for his article is largely concerned with this, and the two operations are inseparable.

In 1906 (*Lancet*, August 11th) I introduced the method of reducing the size of a hydronephrotic sac by resection of a large triangular flap and forming a funnel-shaped pelvis at the same time that the obstruction at the uretero-pelvic junction was corrected. Since that time until 1931, when I retired from practice, I continued to carry out this operation as cases appeared, and I was under the impression that some at least of my colleagues treated hydronephrosis in this way. I had not much time to collect my cases, and, in fact, delayed doing so until I could give some account of the late results and correct the statements of French writers that the results were uniformly bad. I had begun to examine the function of the renal pelvis in these operated cases by serial radiographs, comparing the results with the normal time of emptying. This work was cut short by my retirement from practice.

Mr. Hamilton Bailey could have found in British text-books the basis for his article instead of seeking it in foreign journals.—I am, etc.,

Goring, Oxon, Oct. 13th. John Thomson-Walker.

Pulmonary Tuberculosis and Pregnancy

Sir,—In your interesting symposium on pulmonary tuberculosis and pregnancy Professor Henry Cohen states that the mechanical effects of the enlarging uterus on the lung, although the source of much armchair speculation, have not been adequately studied. The comparative rarity, in these days of contraception, of associated phthisis and pregnancy gives us insufficient material to study these mechanical effects, but some radiological observations which I reported to the Tuberculosis Association eighteen months ago throw considerable light on the problem.

A series of ten pregnant women was examined, and of these seven showed the interlobar fissure between the right upper and middle lobes clearly. In four of the seven the fissure was at the level of the second interspace, and in the remaining three the fissure was in the first interspace. Only two of them were examined after pregnancy; these showed the fissure in the third and fourth interspace respectively three weeks after parturition.

These findings demonstrate clearly that on the right side the maximum effect of an enlarged uterus is in the upper lobe, which is compressed to one-third of its normal size. The commonest site of cavitation in phthisis is the right upper lobe, and it is obvious that a pregnant patient with a right upper lobe cavity would get selective collapse of her cavity between the fifth and ninth months of her pregnancy. After delivery the rapid descent of the diaphragm, with full re-expansion of the upper lobe, would result in dragging open a partially healed cavity and exacerbating the disease. It is probable that other than mechanical factors are involved, but the solution of the problem could be hastened by serial radiography of selected cases between the second and ninth months of pregnancy.—I am, etc.,

London, W.1, Oct. 19th. Peter Kerley.

Sir,—The last paragraph in the leading article on pulmonary tuberculosis and pregnancy in the *Journal* of October 17th was so dogmatic as to be, in our opinion, highly dangerous. One of the main points which emerged from Professor Cohen's eminently judicial paper to the meeting of the combined Sections of Obstetrics and Gynaecology and Tuberculosis at Oxford was the absence of any statistical confirmation as to the merits of abortion early in pregnancy complicated by tuberculosis. But, apart altogether from this aspect, we are more than doubtful whether any obstetrician would be rash enough to claim ability to discriminate between active and quiescent disease of the lungs, and therefore how far an abortion was likely to influence for good or ill the condition of the patient. Our considered opinion is that consultation between the obstetrician and "the tuberculosis expert" is most desirable when pulmonary tuberculosis complicates pregnancy, and imperative when the question of abortion for this condition arises.—We are, etc.,

William Stobie,
President, Tuberculosis Section, Oxford Meeting, 1936.
Norman J. England,
Oxford, Oct. 20th. Secretary of Section.

Sir,—In the two interesting articles by Professor Young and Professor Cohen published in the last number of your *Journal* I observe that my name is mentioned by both these authors, but that bibliographical references are omitted. For those of your readers who may care to read my own paper and to judge of the adequacy or otherwise of the data upon which it is based, may I repair this slight omission, so far as I myself am concerned, by stating that my article appeared in the *Journal of Obstetrics and Gynaecology of the British Empire*, vol. xxxviii, No. 2.—I am, etc.,

Liverpool, Oct. 19th. A. Leyland Robinson.

Treatment of Fractures

Sir,—The report of the British Medical Association Committee on Fractures has stimulated an interest in fracture cases, their method of treatment, and the organization of fracture clinics. The terms "Böhler methods" and "organized fracture service" are heard with increasing frequency. This is as it should be, but these terms should not be loosely used lest discredit be brought upon an advance in surgery. Two recent articles in the *British Medical Journal* are cases in point. I refer to the "Report on the Fracture Clinic of the Kent and Sussex Hospital," by Mr. W. Harvey Gervis, in the issue of September 26th (p. 640), and to the article on "Treatment of Recent Dislocation of the Carpal Semilunar Bone," by Mr. A. F. Goode, which appeared on July 4th (p. 11).

The former paper outlines the reorganization of a fracture service in the hope that it may be of interest to provincial hospitals of a similar size. In the first paragraph under the heading "Organization" the author states, "All fracture cases are seen and treated in the first instance by whoever is on duty in casualty. Usually it is the casualty officer, but it may be one of the house-surgeons." This is the basic fault of unorganized fracture services, where the original reduction of fractures is relegated to whatever house-surgeon happens to be on duty; and where such a loose arrangement exists I do not feel that the term "organized fracture service" should be used. It is significant that the following sentence appears under "Colles Fractures." "I did many of the second reductions for cases that had not been properly reduced under a local, as then one could say that one merely had to make a slight adjustment, thus avoiding the idea in the patient's mind that the fracture had not been properly 'set.'"

The second paper is prefaced by the remark that one reason for its appearance is "that insufficient recognition has been given to L. Böhler's methods of reduction." The first case report tells of a woman with signs of median nerve involvement whose dislocated semilunar was reduced by hyperextension of the wrist. This method is mentioned by Böhler only to be condemned, and is listed under errors in treatment! In his description of the reduction of second and third degree dislocation, Mr. Goode describes a tug-of-war between the surgeon and one, or preferably two, assistants, the patient's hand and forearm acting as the rope. Surely this has little in common with the axis traction described by Böhler in which the traction band plays such an important part.—I am, etc.,

Clayton Hospital, Wakefield, Oct. 14th. NEIL DOUGLAS-GORDON, M.D., C.M.McGILL.

Ether Convulsions

SIR,—With reference to your annotation on ether convulsions on page 723 of the *Journal* of October 10th, I would be glad if you would permit me to make the following observations.

1. In my paper I described *two* cases in which calcium salts had been given intravenously and with success. I referred to a third case in which the patient died, but this was fifty-eight hours after the calcium had been injected and had given a certain temporary relief. I suggested that in this case the reactionary hyperpyrexia consequent on severe convulsions had produced irreversible changes in the cerebral tissues, so that death inevitably resulted.

2. With regard to the other observations in your annotation, it is generally agreed that convulsions develop late during *deep* anaesthesia, and that the surgical manipulations are not necessarily excessive in violence. Further, most anaesthetists agree that the employment of chloroform is dangerous. Incidentally, convulsions can hardly be classified as ether convulsions if they occur during an operation under local anaesthesia—they more probably are epileptic or (in marasmic children) tetanic in nature.

3. The most important recent communication on this condition is that of Dr. J. U. Human on page 426 of the *Journal* of August 29th. He relates how convulsions appeared in a case of appendicectomy in a youth, but that he noticed, long before the convulsions began, that the abdominal muscles twitched when touched, although anaesthesia was deep. This twitching was not apparent at the commencement of the operation. That the surgeon made no complaint as to lack of relaxation is evidence that anaesthesia was adequate. Hyperirritability of muscle to ordinary stimuli is, of course, characteristic of tetany, and is the basis of Chvostek's and Erb's phenomena in that condition.

I regard Dr. Human's evidence as extremely strong support for my suggestion that these convulsions are associated with a temporary derangement of calcium metabolism.—I am, etc.,

A. S. HOSEASON, M.D., M.R.C.P.
Laking-Dakin Research Fellow, St. George's Hospital.

London, S.W.7, Oct. 10th.

Tuberculous Cervical Glands

SIR,—I have read Dr. Brian C. Thompson's article in the *Journal* of September 19th (p. 584) and the subsequent letters on the subject with much interest. Having had a rather large experience in the surgical treatment of tuberculous glands I should like to make some comments.

A big proportion of cases in my series have been advanced cases—that is, the glands were in all stages of caseation, suppuration, or adherence to surrounding structures, often with involvement of the overlying skin. Many have had the "usual" previous treatment—tuberculin, cod-liver oil, etc.—and been sent to hospital because this had failed.

It is a striking fact, as Dr. Thompson notes, that the glands are found, at operation, to be larger and far more numerous than was expected from clinical examination—surely *one* argument in favour of operation! Dr. Thompson says that in his forty-four cases complete excision was "attempted"; this begs the whole question. When it is realized that tiny glands, no bigger than a small pea, are often found on section to be completely caseous the necessity for a radical operation is clear. And even in the worst cases a complete excision *is* feasible in most instances: it is merely a matter of time and patience. It is only when the glands are high up, involving the parotid gland, and the facial nerve may be injured, that one need hesitate to make the operation complete.

I have had two deaths in my series: one of a child of about 10 years, in whom the operation was long and difficult; and the other in an infant aged 3 months, who, although thriving "on the breast," was given cream in addition by an over-zealous nurse and rapidly developed a large gland in the neck. As the gland in the latter case was softening and apparently isolated and superficial, I advised operation, hoping it would be quick and safe. Unhappily it was the old story: the gland that was obvious, *and* lots of others deep down along the jugular vein—death from shock following soon after the operation. This case is of interest: (1) as proving the "milk origin" of tuberculous glands; and (2) as showing how very rapidly and extensively the gland infection may occur. The next youngest patient I have had was a child aged 1 year in whom the glands were equally extensive—many adherent to the internal jugular vein—and in whom the wound healed perfectly, and who has remained quite well. In my experience recurrence is rare, also nerve injury (rarely one of the lower facial branches). It is surprising *how* satisfactory excision is—both as regards complete cure and cosmetic appearances—even in bad cases if the operation is done thoroughly. A stay in hospital of ten to fourteen days for operation is far preferable to "months or years" of other treatment.

As to the technique of operation. Glands can usually be removed through a curved incision a little below, and parallel with, the jaw, under which the scar is hidden. If more room is needed a short vertical incision is carried down from the middle of the primary one, and skin flaps are reflected. When the skin is involved in the tuberculous process it is generally possible to excise it and yet obtain easy union of the healthy skin edges. The anterior border of the sterno-mastoid is defined and retracted. Unless there is a marked periadenitis removal of the

glands can be quickly and easily accomplished with the forceps dissector devised by the late Mr. Littlewood of Leeds. The closed forceps is introduced at two or three spots in turn into the areolar tissue surrounding the gland and then opened; in this way the gland can be "delivered" much more quickly and safely than by dissection. Glands can usually be separated from the internal jugular vein, and it is rarely necessary to excise a portion of the vessel. Even tiny glands may be caseous, and these can be avulsed or "teased" away with the fingers and wet gauze together with the surrounding fatty tissue. Rarely the sterno-mastoid must be divided in order to reach a gland breaking down and adherent to the deep surface of the muscle. At the close of the operation the wound should look as "clean" as an anatomical dissection. The skin edges are united with a fine curved needle and fine silkworm-gut. A small tube drain is inserted, and this is fixed by a suture passing through both skin edges and only "half-tied." In twenty-four or forty-eight hours, by slitting down the tube, the latter can be released without cutting the stitch, which is then fully tied and the wound closed.

Occasionally I have removed biggish masses of discrete glands which shelled out so *very* easily as to raise the question of Hodgkin's disease, but which on section appeared definitely tuberculous. So that, clinically, the diagnosis may not always be easy. I come, finally, to a very interesting and practical point—namely, the very marked decline in this district in the incidence of cervical gland tuberculosis in recent years. This gratifying result is, I think, largely due to the zeal of Major D. S. Rabagliati, F.R.C.V.S., and his co-workers in the veterinary department of the W.R.C.C. in their campaign to secure a pure milk supply. His aim at securing tubercle-free herds would, if attainable, go far to blot out not only cervical gland tuberculosis but surgical tuberculosis in general, and is therefore an ideal well worthy of pursuit by all the parties concerned.—I am, etc.,

Wakefield, Oct. 15th. G. W. Thomas, F.R.C.S.

P.S.—The above was written before the letter from Mr. Miles Atkinson of New York appeared in the *Journal* of October 17th. He puts the case for surgery very admirably and completely, and I am in active accord with his experience and conclusions.

Sir,—When a lymphatic gland which has been infected by tuberculosis spontaneously subsides without abscess formation it is by an extremely slow shrinkage, ending in a persistent calcareous nodule, easily visible by *x* rays. Those who describe rapid and complete disappearance of grossly enlarged tuberculous cervical glands after radiation treatment are assuming some quite different process of healing. What is the evidence that the condition cured was not a subacute streptococcal infection, the sort of thing so frequently seen to persist a few weeks in the inguinal glands from a sore in the leg?—I am, etc.,

London, W.1, Oct. 19th. Denis Browne.

Carbon Dioxide Absorption from Anaesthetic Atmospheres

Sir,—The three essentials for success mentioned by Dr. Ralph M. Waters in his address to the Anaesthetics Section of the Royal Society of Medicine[1] have been known for several years—namely, completely free airway; absence of leakage; and low resistance to breathing during absorption.

The first two difficulties are overcome by the use of an inflatable rubber throat tube used in conjunction with a gas-tight apparatus of very simple design. This tube in practice prevents the escape of saliva (often infected) from the mouth into the air passages, and so prevents those chest conditions which Dr. Jarman mentions: it also provides the free and permanent airway which allows Dr. Waters to keep out of the surgeon's way. The third essential is most satisfactorily attained with a liquid absorbent in which a movable baffle allows of variable resistance with complete washing of the breath in *both* directions. This is valuable in the more feeble cases.

These essentials are combined in a simple, compact, and inexpensive apparatus, which is the outcome of one demonstrated by me at the Bournemouth Meeting of the British Medical Association in 1934.—I am, etc.,

Glasgow, Oct. 13th. W. B. Primrose.

[1] Reported in *British Medical Journal*, October 10th, 1936, p. 735.

Treatment of Tetanus

Sir,—With reference to the paper on the treatment of tetanus in the *Journal* of September 12th (p. 538) and the letter on October 10th (p. 738), I have recently vacated the post of resident surgeon in one of our colonial hospitals, where I have been for the past eight years. In this colony tetanus was very common, more especially among the labouring class who worked in the cocoa fields. On first taking over the hospital I carried out the various forms of treatment as mentioned by Mr. D. C. L. Fitzwilliams, and with exactly the same results. On looking up my records I find that the time factor in my cases was, for all practical purposes, the same as that given by Mr. Fitzwilliams. There was one exception, a boy aged 11, who developed symptoms five days after receipt of the wound and survived, though in this case the history was doubtful.

As a matter of interest I might mention that one of the local doctors, who had been in practice there for nearly thirty years, told me his treatment had always been rum and morphia, and with that treatment his results had been as good as they later were with the use of serum, excision, etc. I personally have had no experience with this form of treatment.—I am, etc.,

Worthing, Oct. 13th. Matthew Clayton-Mitchell.

Traumatic Oedema

Sir,—I read with interest Dr. L. C. Hill's excellent article in the *Journal* of September 26th (p. 623), and agree that the type of case he describes often presents the greatest difficulty. He discusses the various theories as to the causation—venous, lymphatic, and sympathetic—of traumatic oedema. There is no doubt that this condition occurs more easily in neglected cases of injury in elderly patients, and in vasomotor and lymphatic types. But Dr. Hill makes no mention of the following disease process, which surely is one of the most important causes of persistent traumatic oedema. Injury causes the extravasation of both blood and lymph into the tissues, at the same time damaging the venous and lymphatic circulation. The muscles in the injured area become atonic and wasted, partly due to the toxic effect of the traumatic effusion on the muscles themselves, and partly to the concussion of the nerves to the muscles by the injury. Complete rest makes for further wasting and atonia from disuse.

Now normal muscle tone is essential for supporting and maintaining a normal circulation—arterial, lymphatic, and venous. We can observe this clinically in the limb that becomes oedematous as the result of lack of tone following complete rest. In the case of injury we have a damaged returning circulation, which is further

embarrassed by loss of the support and pumping action of the muscles. I suggest that in all the cases mentioned by Dr. Hill unabsorbed traumatic effusion was present, and in some of them adhesions had formed. A vicious circle was established: (1) the returning circulation was damaged; (2) the tissues were loaded with unabsorbed traumatic effusion; (3) the muscles were atonic and wasted.

In the early stages following an injury the fluid portion of the traumatic effusion may be absorbed quickly, but soon much of the fibrin and cells become inspissated, and later cause a fibrous tissue reaction. In order to get this inspissated debris or fibrous tissue mass absorbed after it is first formed, it is necessary to peptonize and liquefy it, with the result that the part becomes swollen again. All the forms of physical treatment mentioned by Dr. Hill are bound to cause an increase of swelling, especially massage, as they have the effect of stirring up the unabsorbed traumatic effusion locally without being able to clear it away from the damaged part, because the venous and lymphatic circulation has not been re-established.

Injury also liberates the H-substance described by Sir Thomas Lewis into the tissues. This substance in a moderate amount causes dilatation of the local vessels with some oedema, and is beneficial in aiding absorption, but in large quantities it produces excessive oedema. Is it not possible that massage itself at this stage exerts a deleterious action on the tissues by traumatizing them and causing further production of H-substance with oedema? We must break this vicious circle, and this can only be done by treatment to the muscles. The benefit of early movement of the muscles depends entirely on these points—that is, the spreading of traumatic effusion to healthy lymphatics and venules and the maintenance of muscle tone, with its supporting and pumping effects on the circulation.

If Dr. Hill had prescribed the following treatment in every case he recorded of traumatic oedema, and had adhered to it for two or three months if necessary, I think he might have obtained more satisfactory results.

1. Support to the muscles. Example—plaster-of-Paris cock-up splint for the wrist so that the fingers move freely. Gentle active movements without strain must be carried out.

2. Gentle faradic contractions given daily by the method advocated by Sir Morton Smart. Massage can only possibly promote absorption of traumatic effusion through the superficial lymphatics, whereas active movements without strain and artificial stimulation of the muscles by faradism help absorption by the deep lymphatics as well as the superficial. We must not be distressed by the persistence of oedema at first, because active movement is helping to liquefy the unabsorbed traumatic effusion, and swelling is bound to be present, although we must control the treatment so that it never becomes excessive. Gradually as the circulation becomes re-established the oedema will disappear.

3. Manipulative movements. If adhesions are thought to be present forcible manipulation should never be performed until the muscle tone and circulation have recovered sufficiently to allow absorption of the broken-down adhesions. Therefore it usually has to be carried out late in the recovery stage.

—I am, etc.,

London, W.1, Oct. 12th. W. E. Tucker.

Blood Groups and Paternity

Sir,—The medico-legal value of blood groups in cases of disputed paternity has again been discussed in a recent appeal at the Hertfordshire Quarter Sessions. Here both the mother and child were of Group A, while the putative father was of Group O. Apparently the M and N types were not investigated, although it is in cases such as this, in which the primary groups (O, A, B, and AB) yield no definite information, that such type determinations are most useful. By now the heredity of the M and N groups is as fully established as that of the primary groups, and provided that one uses sera of a sufficiently high titre to agglutinate the weak N_2 cells (Thomsen, Second International Congress of Microbiology, London, 1936) there can be no doubt that the two are of equal value.

In such a widely publicized case it was unfortunate, perhaps, that no positive decision could be made, but more unfortunate still must have been the effect upon the general public who were confronted with newspaper headlines such as "K.C. Contends Blood Test is Worthless as Proof of Paternity." I have no doubt that this is merely journalistic licence, and that counsel for the defence had no intention of discrediting the test, bringing it in merely to show that the plaintiff could not be excluded from paternity. The impression on the public mind, however, remained.

May I make it clear that so far no one has ever attempted to use blood groups as a *proof* of paternity. Their value lies in the fact that in certain cases it is possible to *disprove* paternity by stating that the putative father could not be the actual father. The probability of this disproof in the case of an innocent man is about 1 in 6 by the primary groups alone, rising to about 1 in 3 if the M and N types are also determined (Wiener, *Journ. Immunol.*, 1933, xxiv, 443). If other children or relatives can be examined the chances are greatly increased, as it is often possible to determine the homo- or hetero-zygous nature of the genotypes of the persons concerned.

The chances of a man establishing his innocence vary with the group to which he belongs. They are lowest in Group A (1 in 13) and highest in Group AB (2 in 5). Using the M and N groups in conjunction with the primary groups the chances are highest in Group ABN (2 in 3). These figures do not, of course, take into account the groups of the mother and child; they represent his chances in any and every paternity case in which he may be involved.

In the case in question the putative father (Group O) had, at the start, a 1 in 4 chance of proving his innocence. If the M and N groups had been determined his chances would have been rather better than 1 in 2 had he been either in Group OM or ON. The probability is not altered in Group OMN.

In the remaining cases it is impossible, in the present state of our knowledge, to give any definite decision. In these the scientific evidence is valueless except in so far as it shows that the man cannot be excluded from paternity. Under these circumstances it should not be brought into court.—I am, etc.,

John C. Thomas,
Hendon, N.W.9, Oct. 19th. Serologist, Metropolitan Police Laboratory.

Medical Coroners

Sir,—It may be that I can amplify the letters of Mr. W. B. Purchase and Mr. Ingleby Oddie which were published in the *Journal* of September 12th (p. 560) and September 26th (p. 647) respectively, as I practised as a solicitor in London for twenty-eight years before being appointed a coroner in 1933, and have had some practice in medicine since qualifying in 1925.

The conclusions I have repeatedly come to during the period that I was a deputy coroner in London, and since becoming a full-time coroner, are that the medical training is the more important in the coroner's work and that the legal qualification is secondary to the medical. A legal training is undoubtedly of great value in the careful evaluation of evidence in open court, but inquests do not form the only work of a coroner. He has much to do

in his office examining the reports of his officers and deducing therefrom whether or not an inquest is necessary, and in directing that post-mortem examinations should be made by a pathologist, perusing these pathological reports, which are highly technical and clearly require a medical training for their proper comprehension, and then arriving at his conclusions.

As a coroner is always dealing with the causes of death and the signs and symptoms that precede death, it appears to me altogether inappropriate that the decision on these matters should be left to those who have had a legal training only. Very little law is required by a coroner in comparison with the number of medical questions that are constantly arising. What law is required can be looked up quickly with a reasonable amount of certainty; but that is not so with medicine, for its understanding is based on a complete education and training in anatomy, physiology, and pathology, and on the clinical experience gained by the medical man during his course at hospital and after qualification.

It is interesting to note in Chapter X of the Report of the Departmental Committee on Coroners on "Deaths under Anaesthetics or during Operation" (para. 148) that the following statement is made: "The coroner and the coroner's officer have not the necessary training to make a scientific investigation"—that is, in the case of deaths under anaesthetics they have not the necessary training to determine whether there should be an inquest or not. This statement was obviously arrived at from the fact that the great majority of coroners are not medical men, and yet this report advocates that only solicitors and barristers should be appointed as coroners. Does this mean, if the report is adopted, that deaths under anaesthetics are to be investigated by men who have not had "the necessary training"?

If the coroner has the two qualifications—law and medicine—does it not appear that he is the better equipped to judge his cases from all points of view and to the greater satisfaction of the public and all concerned?—I am, etc.,

P. Bernard Skeels.

Coroner's Court, Walthamstow, Oct. 15th.

*** Editorial comment on this subject of medical coroners appears at page 819, and the *Supplement* (p. 219) contains the full text of a memorandum recently presented by a deputation of the B.M.A. to the London County Council.

Nutrition and Orthopaedics

Sir,—Realizing what a great debt medicine owes to Sir Robert McCarrison I am extremely sorry to have to disagree with him most profoundly in his acceptance of the radiologist's report in the case of supposed "cure" of spondylolisthesis by nutritional methods. This is no place to commence an acrimonious discussion with a person so respected as Sir Robert. Important errors in interpretation and technique are involved which probably are outside his sphere. The case that he mentioned is one of great interest, for it was the earliest recorded in clinical literature (*Proceedings Royal Society of Medicine*, 1935), and well illustrates the radiological diagnosis of early spondylolisthesis (see *British Journal of Surgery*, 1932).

I may be accused of wishing to have the last word in stating that this youth still had radiological evidence of spondylolisthesis when last *x*-rayed. The last word, however, is not now but in the years to come. In the meantime perhaps Sir Robert could arrange for new radiological studies under perfect conditions. The result would be well worth reporting in this *Journal*.—I am, etc.,

Exeter, Oct. 17th. Norman Capener.

The Earliest Sanatoria in England

Sir,—Your note in the *Journal* of September 12th (p. 557) under "Dr. Noel Bardswell," and Dr. S. Gurney Champion's letter in your issue of October 10th on the beginning of sanatorium treatment in England are interesting. In the interest of accuracy may I say that the Society for the Prevention and Cure of Consumption in the County of Durham was formed as the result of a suggestion made by me in a presidential address delivered at the annual meeting of the North of England Branch of the British Medical Association held in the Town Hall, Sunderland, on July 11th, 1898. It resulted in the opening, as a sanatorium, of Horn Hall, Stanhope, in the county of Durham, to which the first patients were admitted on May 15th, 1900. We have now two sanatoria, that at Stanhope for forty-five men and boys, and that at the Leazes House, Wolsingham, for thirty-three women and girls, opened on May 1st, 1909. We have had nearly 8,000 patients to date, and I have been chairman of the committee of the society from the beginning. Dr. Rushton Parker, then of Kendal, began a similar movement for Westmorland, I believe in 1899, and the Meathop Sanatorium, near Grange-over-Sands, admitted patients a few months before we did at Stanhope. There was also in existence at that time in Scotland the Victoria Hospital for Consumption, near Edinbugh, of which we had not heard. Neither had we heard of the Norfolk efforts at the time we began. Dr. Champion's interesting chronological statement therefore needs a little correction.—I am, etc.,

Sunderland, Oct. 17th. Wm. Robinson.

Deep X-Ray Therapy after Radical Operation

Sir,—A case has recently come to my notice in which treatment by deep *x*-ray therapy appeared to have disastrous results, and it seems important to inquire how professional opinion regards them.

The history of events was briefly as follows. Operation for carcinoma of the breast. Wound healed, and all well. One month later, on the surgeon's advice, the patient was given deep *x*-ray therapy on several occasions at a centre near the patient's home. One week after the last of these applications erythema developed, with abscess formation over the site of the operation, and cellulitis. The case ended fatally.

The sequence of events is such that the relation of cause and effect is irresistible. Four questions arise:

1. Theoretically, after a radical operation is this treatment sound?
2. Practically, does experience favour it?
3. Statistically, what is the registered cause of death?
4. How far are surgeon and radiologist in touch with each other in cases of this kind?

Such cases are much discussed by the relatives and friends of patients, and are apt to create a scare which might go far to bring this method of treatment into disrepute.—I am, etc.,

October 10th. Retired I.M.S.

An Unhappy Slogan

Sir,—We have all become familiar with advertisements which express themselves in such terms as "Eat more often," "Drink more beer," "Eat more fruit," etc. The public knows approximately what value to place on such injunctions, but lately there have been advertisements issued in connexion with an electric light campaign, and some of these are positively misleading in that they suggest that stronger electric light can be a substitute for glasses.

One advertisement which I consider to be damagingly erroneous depicts a boy throwing aside his spectacles with the remark, "What! Glasses! Not for me!" This comes just at a time when the public is beginning to realize how much can be done for the "lazy" eye by glasses and by orthoptic training, and we seldom now hear the old advice, "Let him alone and he'll grow out of it."

Because of the prejudice against glasses in the Victorian days, when a working man found it difficult to get a job if he had them, it has been a hard fight on the part of medical practitioners to educate their patients to a true estimate of what can be done for subnormal vision, especially in those who are unconscious of their defect —the children.

Manufacturers of electric light bulbs in their campaign to "Use more light" should not, wittingly or unwittingly, lead us back to the dark ages.—I am, etc.,

London, W.1, Oct. 9th. FRANCIS E. PRESTON.

Memorial to Dr. David Eder

SIR,—The desire has been expressed in many quarters to establish a memorial to the late Dr. M. D. Eder, to commemorate his selfless services to medicine, to social science, and to the cause of Zionism. It is felt that not only psycho-analysts and Zionists would like to be associated with this memorial, but also many working in the spheres of medicine and social science who knew of Dr. Eder and of his work. After mutual discussions and consultation with Mrs. Eder, it has been decided to offer to the Hebrew University in Jerusalem a psychological library that will bear Dr. Eder's name. Mrs. Eder is presenting Dr. Eder's own library as a nucleus, and it is intended to mark this act by a simple ceremony, to take place later.

It appears to us unnecessary to labour this appeal to those who cherish the memory of our late friend. This memorial is one that he himself would have appreciated, since it is designed to promote the cause of scientific research in the branch of learning in which he was pre-eminently interested and in the institution to the establishment and development of which his strenuous labours had been devoted during the past two decades. In the midst of the war, while the guns were still roaring, Dr. Eder was one of that small band of idealists who laid the foundation stone of the Hebrew University on Mount Scopus. When, after five years in Palestine, he returned to England he devoted every spare moment of his busy life to the promotion of the interests of the university. He was the chairman of the advisory committee which prepared the schemes for the first science departments; he subsequently became one of the governors of the university; and, finally, he was the moving spirit in the establishment of the organization of the "Friends of the Hebrew University" in this country. Few men have played so significant a part in the shaping of the early destinies, the schemes of studies, and the constitution of the university.

Dr. Eder's place in the history of Zionism is too familiar to need emphasis. As chairman of the Palestine Zionist Executive and as president of the English Zionist Federation, he rendered unforgotten service to the cause of Jewish reconstruction in Palestine at decisive moments in the history of Zionism. His work in the sphere of psycho-analysis is well known to members of the International Psycho-Analytical Association, and his place in the history of psycho-analysis was appraised in the *International Journal of Psycho-Analysis* in the April issue for 1936. The many tributes to his memory which have appeared in the Press, both of this and of foreign countries during the past few months, bear witness to the loss which the causes of social effort and scientific inquiry have suffered by his passing. We who were privileged to know and collaborate with him mourn the loss of an untiring worker and a courageous pioneer, one whose ever-helpful personality will always live in our memory. We are sure that many will wish to perpetuate his memory by assisting to further an object he would have had so much at heart. All subscriptions should be sent to the honorary secretary and treasurer, Mr. Maurice Sorsby, 86, Harley Street, W.1. —We are, etc.,

ALBERT EINSTEIN	MELCHETT
SIGMUND FREUD	REDCLIFFE N. SALAMAN
PHILLIP J. HARTOG	ARNOLD SORSBY
ERNEST JONES	CHAIM WEIZTMAN
J. L. MAGNUS	H. G. WELLS.

Obituary

FRANK PEARSON CRESSWELL, F.R.C.S.

Consulting Ophthalmic Surgeon, Cardiff Royal Infirmary

Mr. Frank Pearson Skeffington Cresswell, a well-known South Wales ophthalmic surgeon, died at his home in Cardiff on October 6th. He was the elder son of Dr. Pearson Robert Cresswell, who, after his appointment as chief surgeon to the Dowlais Iron Company in 1860, was the first surgeon to introduce the antiseptic treatment of surgical wounds into South Wales.

Frank Pearson Cresswell was educated at Christ College, Brecon. After studying medicine at Cardiff, where he was one of the original pupils, he proceeded to Guy's Hospital. He graduated B.Sc.London in 1887, and M.B. in 1893. He took his M.R.C.S., L.R.C.P. in 1892, and became a Fellow in 1894. He then went abroad and spent some time in post-graduate study in Utrecht. On his return he was appointed clinical assistant to the Royal London Ophthalmic Hospital and prosector to the Royal College of Surgeons. Some time later he came to Cardiff, to enter into partnership with the late Mr. Tatem Thompson, who was the senior ophthalmic surgeon to Cardiff Royal Infirmary at that time. Not long afterwards, on the death of Mr. Tatem Thompson, followed by that of Mr. Ensor, who unfortunately died while undergoing the operation of turbinectomy, Mr. Cresswell became senior ophthalmic surgeon to the Infirmary, a post he held with distinction until his retirement in 1932, when he joined the consulting staff. Until a week before his death he was still actively engaged in practice, although his health had been failing for the past year. He was ophthalmic surgeon to Merthyr General Hospital, to Aberdare General Hospital, to the Royal Hamadryad Seamen's Hospital, and to the Welsh National Memorial Association for Tuberculosis. Until his retirement in 1932 he was lecturer in ophthalmology in the Welsh National School of Medicine. He was ophthalmic referee for South Wales under the Workmen's Compensation Act.

Mr. Cresswell had been a member of the British Medical Association for forty-two years, and in 1928 was president of the Ophthalmological Section when the Annual Meeting was held in Cardiff, having been honorary secretary of the same Section twenty-two years earlier at Toronto. He was a Fellow of the Royal Society of Medicine and a past secretary of the Cardiff Medical Society. He was a most enthusiastic Freemason, and made the study of the Craft the sole interest of his spare time. The following are some of the offices that he held: Past Grand Master of the Royal Somerset and Inverness Lodge, No. 4; Past Master of Prince Llewellyn Lodge, and St. Weistan's Lodge, Malvern; founder of Universities Lodge, and many others; P.P.G.D.C. E.A. South Wales; Past

Grand Deacon of England ; Deputy Provincial Grand Master of Provincial Grand Lodge of Mark Masons of South Wales ; Past Grand Overseer of England ; Very Eminent Provincial Prior of Order of Knight Templars—Province of Somerset, Monmouth, and South Wales, K.C.T. ; Grand Inspector-General of South Wales and Monmouthshire—The Supreme Council 33 ; Deputy Provincial Grand Master of Royal Order of Scotland Provincial Grand Lodge of South-Western Counties ; P.G. P.C. of M. Royal and Select Masters ; P.G. H.C. Red Cross of Constantine ; P.G.A. Allied Degrees.

Mr. Rupert Parry, F.R.C.S., sends the following personal tribute :

I had known Mr. Frank Cresswell as a colleague for many years, both in my capacity as assistant to him at Cardiff Infirmary and also in the years since his retirement. He was a man of extremely generous nature, as his various offices in Freemasonry show ; somewhat difficult to know, but when once the initial stage was over a true friend and colleague. He was ever ready to give others the benefit of the doubt, and I never knew him to question the motives of another, even if he disagreed with him. He usually had a good word to say about everybody. A straighter or more upright man one could not wish to meet. He was extremely sociable, and loved nothing better than a social function, where he could chat with his friends. One of his greatest pleasures was to carve the patients' turkey on Christmas Day, often leaving his own Christmas dinner until a late hour so that his patients should receive the benefit of his cheerful company. In this side of his life especially he will be very difficult to replace. By his death all of us feel we have lost an irreplaceable friend and colleague.

JAMES HILL, M.D.

Past-President, Glasgow and West of Scotland Branch

The death of Dr. James Hill on Sunday, October 11th, took place with startling suddenness. He was driving home in his car from Dunfermline, where he had been on a visit to his sick daughter ; nearing Glasgow his chauffeur suddenly became aware that he had fallen in his seat, and when a doctor examined him shortly afterwards it was found that he was dead.

Dr. Hill was in his seventy-second year. He graduated M.B., C.M., with commendation, at Glasgow University in 1890, and took the degree of M.D. five years later. After graduation he did some assistantships, and for about two years was assistant physician under the late Dr. James W. Allan in Glasgow Corporation Fever Hospital at Belvidere, an appointment (as all Belvidereans will acknowledge) which almost more than any other lays a solid foundation for the practice of medicine. He then started practice in Renfrew, from which town he never moved. He soon became recognized as an unusually conscientious and knowledgeable and sympathetic doctor. While he kept himself abreast of modern knowledge and was diligent in his attendance at the Royal Medico-Chirurgical Society of Glasgow, he would rather have been regarded as belonging to the older type of family physician, so commonly the family counsellor and friend as well as physician.

Dr. Hill took a lively interest in the affairs of the British Medical Association, and was president of the Glasgow and West of Scotland Branch in 1927–8, and chairman of the Renfrew and Bute Division for three years. While the National Health Insurance Act was in his judgement (politically and socially he was a strong Conservative) an unwarranted encroachment on the traditional relationship between doctor and patient, and not likely to be conducive to the best interests of medicine, he accepted the scheme and loyally carried out its provisions in his own town, and gave valuable service to the profession for many years as chairman of the Renfrew County Insurance Committee. In carrying out this duty, for which temperamentally he felt himself rather unfitted, disliking publicity, he became recognized as a man thoroughly well informed, exhibiting scrupulous fairness and unfailing courtesy. His other chief interest was connected with the Church of Scotland, and in his quiet way he did much good work. At the time of his death he was senior elder of the North Church, Renfrew.

He leaves a family of one daughter and three sons, two of whom are members of the medical profession—one a senior ship surgeon in the Cunard Line, and another a medical officer in the R.A.F., stationed at Singapore. The funeral service in the North Church was attended by a large congregation, and it was a sad circumstance that no one of his own family could be present.

JOHN INNES MOIR, M.B., D.P.H.

Senior Medical Officer, British Honduras

Dr. John Innes Moir, eldest son of the late Alexander Moir, M.A., of Aberdeen, was born in 1897 in Dundee. He was educated at Gordon's College and Marischal College, Aberdeen, and took his medical degrees at the University in 1921. He served in the Navy during the latter part of the war, acting as surgeon probationer in H.M.S. *Myrtle*, a mine-sweeper. After graduation he was appointed to the Aberdeen Sick Children's Hospital, and later to the Aberdeen City Hospital, where he worked for some time with Drs. Matthew Hay and Parlane Kinloch.

In 1923 Dr. Moir was appointed M.O. to the Falkland Islands Company, and during this appointment performed many remarkable feats of surgery. He was noted for his horsemanship and endurance of hardship incurred by reason of the severe climate and the vast distances he had to cover on horseback. In 1928 he was appointed to the Colonial Government Service, and was sent as senior medical officer to the Falkland Islands Government in January, 1929. While in that colony he was made a member of the Executive and Legislative Councils, he received a commission in the Defence Force, and, with the rank of major, was made commanding officer. His intimate knowledge of the colony proved most helpful in the many sham battles fought by the various crews of His Majesty's ships on their frequent visits to the Islands. He was also commissioner of Boy Scouts and a justice of the peace. In 1934 he was transferred to British Honduras, where he took up duties of senior medical officer in January, 1935, and was elected president of the local Branch of the British Medical Association. He reorganized the hospital in Belize—the town which was devastated by a hurricane in 1931—brought the medical department up to full strength, introduced modern equipment, and altogether did much that was useful, lasting, and efficient. He served on the Executive and Legislative Councils in British Honduras, and was a valuable and esteemed servant of the Government.

On September 24th Dr. Moir contracted tetanus and died four days later. His funeral, which was fully ceremonial, was attended by thousands of people of all classes, who mourned a great man and a true and loyal friend. A message of deep sympathy from Sir Alan Burns, Governor of British Honduras, was sent to Mrs. Moir, along with an expression of appreciation and sympathy from Mr. Ormsby-Gore, Secretary of State for the Colonies. Mrs. Moir had just returned to Scotland from British Honduras, and Dr. Moir had hoped to follow early in 1937.

PROFESSOR BORREL

Dr. J. A. Murray, F.R.S., writes from Twickenham: The unexpected death of my friend Professor Borrel on the eve of retiring from the Institute of Hygiene in Strasbourg prompts me to supplement the brief notice in the *Journal* of last week with a tribute to his eminent services to cancer research in the first years of its foundation as an experimental discipline. He ranks with C. O. Jensen in the work at the beginning of this century which established the experimental transmission of the mammary carcinomata of the mouse as a material for the study of the nature of cancer. From the first he adhered to the hypothesis of their virus causation, a point of view he maintained to the end with a courageous enthusiasm which, combined with scientific caution and modesty, secured him a sympathetic hearing from his contemporaries, even when they disagreed. His devotion to technique and the masterly skill which distinguished his work were revealed in his adaptation of ordinary bacteriological methods to a simplification of tissue-culture technique. It is a pleasure to know that this has been preserved in the delightful cinematographic record which he showed in Amsterdam last year at the meeting of the Leeuwenhoekvereeniging. He will be remembered for his vivid personality, which expressed his devotion in word and print to the science.

The Services

TWO OLD OFFICERS AND THE A.M.S.

We have received for publication the following letter from Major-General T. M. Corker, C.B., M.D., A.M.S. (retired).

Sir,—You have published the obituaries of two old friends of mine who passed away this year, but this additional note may be of interest.

Colonel Sir James Magill and I were at the same day-school in Cork about seventy years ago. He was widely read and a classical scholar, and one day of late we were discussing the arms of that ancient city. Between two castles is seen a ship entering a harbour of safety with the motto "Statio bene fida carinis." It is generally thought that these arms indicate the spacious harbour of Queenstown at the outlet of the River Lee. But antiquarian research shows that in the old days, when Cork was a walled city and liable to attack by pirates such as Sallee rovers, an old canal in the city was guarded on the eastern side by two castles, and in our boyhood one of these was still known as the Queen's old castle upon the Grand Parade. To my exposition Magill responded by quoting the line from Virgil (*Aeneid*, II, 22–24) "Statio *male* fida carinis." Virgil was writing of the vile harbour of Tenedos, where Magill was on duty with the Coldstreams during the war. And a very vile harbour it was still. He agreed with Virgil. Sir James Magill was a fine old officer, both kindly and efficient, and it was a pleasure to note how affectionately the Guardsmen treated him, both at Lord's, where we met, and during his illnesses.

Lieut.-General Sir Alfred Keogh and I were also old friends, dating from our entering the A.M.S. in 1880. I do not think the British Army is indebted to any man more than to him for its efficiency, both prior to and during the war. For it must be obvious that without capable and well-cared-for soldiers to fill the battalions no munitions of war, however complete, could avail. Keogh cleared away many old abuses, and was from first to last, when he retired worn out by his work, bent only on maintaining a reliable Army Medical Service. His insistence on the necessity of including our Director-General upon the Army Council, and of all other officers being in the closest touch with their generals, formed one of the keynotes of his policy. No officer who is not medical can adequately express the medical view on any point, especially in these days of rapidly advancing science. When Keogh and I joined the Service there were no operation theatres; all instruments were antiquated; no nursing sisters, and the regimental orderlies detailed for duty with the sick were those whom their colonels were glad to see as little of as possible; and there were no wards for sick officers. To-day the care of the sick and the appointments necessary take rank with those found in my old hospital (Bart's), and no higher praise can be given. These great changes were due in their initiation to Sir Alfred Keogh, and it will be well that both the Army and his own corps shall not forget it.

It was to Queen Victoria that the granting of Army titles to the Medical Services was due, about the year 1900. The value of this change cannot be estimated to-day. I must add my tribute to the feeling of the Army, as never once in my own personal experience were the new titles scorned. The Army as a whole accepted them as right and proper, and they undoubtedly led to increased efficiency. This great advance we owe to the then reigning sovereign. And now King Edward VIII has graciously ordered that those retired officers who have been King's honorary physicians and surgeons should indicate this on their shoulder-straps, as has been the custom with other A.D.C.s of royalty. The appointment of A.D.C. to a sovereign is closely akin to an Order or Decoration. It may be that in the future the Royal Cypher may be worn among the miniature medals on a ribbon of royal colours.

To-day, under the capable Director-Generalship of Lieut.-General Sir James Hartigan, the Army Medical Service is rapidly regaining its standing. The present War Office is more appreciative of its value to the British Army than some in the past; and those who are on the threshold of medical practice would do well to consider it as a career.—I am, etc.,

T. M. Corker,
Major-General.

London, W., Oct. 16th.

NAVAL COMPASSIONATE FUND

At the quarterly meeting of the directors of the Naval Medical Compassionate Fund, held on October 9th, with Surgeon Vice-Admiral Sir Basil Hall, K.C.B., K.H.P., Medical Director-General of the Navy, in the chair, the sum of £186 was distributed among the several applicants.

INTERNATIONAL CONFERENCE ON MILITARY MEDICINE

The sixth session of the International Registration Office of Military Medicine was held at Geneva from October 10th to 14th. Colonel Georgevitch presented a detailed report of the measures taken by the Army of Yugoslavia to deal with typhoid fever, and in the discussion that followed Lieut.-Colonel Capitanovici of the Rumanian Army and Lieut.-Colonel Ferron of France took part. Lieut.-Colonel Schitlowsky of the Swiss Army gave an account of the working of a sanitary division during manœuvres. Colonel Voncken, who is director of the International Registration Office, read a paper by Colonel Leman of Belgium on the organization of health services in various armies. Commandant Capeck of Czechoslovakia spoke on the newer developments of military medicine, with special reference to the physiology of aviation, and two Swiss medical aviation officers (Major Meyer and Captain Loretan) described their personal experiences in the training of Swiss pilots. Colonel Capitanovici described the evacuation of wounded by a division of the Rumanian Army in the last war, and was followed by General Schickele, who detailed the modern improvements which had been introduced in this respect. Practical demonstrations of modern methods of evacuating the wounded and dealing with gassed patients were later given. At the Bernex training centre further demonstration of the treatment of gassed cases was arranged. At the Rotary Club of Geneva Colonel Voncken opened a discussion on the subject of what laws would be observed in future wars. Other topics dealt with during this conference included the protection of civil populations in war time and the problems presented by towns, villages, and the Monaco formula of 1934. On behalf of Great Britain Lieut.-General Sir Harold Fawcus, formerly Director-General of the Army Medical Services, and Colonel W. Benson attended the conference.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a congregation held on October 16th the following medical degrees were conferred:

M.D.—*G. R. Ellis, L. R. W. Price.
M.B., B.CHIR.—G. J. H. Maud, H. B. Bagshaw, A. S. Till, A. H. Zair.
M.B.—E. L. Cohen.
B.CHIR.—*J. F. Lown, *A. B. MacEwan, *J. G. C. Spencer.
* By proxy.

The following candidates have been approved at the examination indicated:

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.—*(Part II)*: V. R. Ginde, A. D. Versteegh, J. B. Watson (old regulations).

UNIVERSITY OF SHEFFIELD

The following candidates have been approved at the examination indicated:

FINAL M.B., CH.B.—*Parts II and III*: Marjorie I. Godson, F. C. Jackson, J. L. Linacre.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

Lectures

The Bradshaw Lecture on "The Integration of Neurology and Psychiatry" will be delivered by Dr. E. Mapother on November 3rd; the FitzPatrick Lectures on "The History of the Acute Exanthemata," by Dr. J. D. Rolleston, on November 5th and 10th; and the Mitchell Lecture, by Dr. R. R. Trail, on "Recent Aids to the Prognosis of Pulmonary Tuberculosis," on November 12th. All the lectures will be delivered at the College, Pall Mall East, S.W., at 5 p.m., and any member of the medical profession will be admitted on presentation of card.

Medical News

The twelfth annual Norman Lockyer Lecture of the British Science Guild will be given by Lord Rutherford, O.M., F.R.S., on the afternoon of November 12th in the Goldsmiths' Hall, Foster Lane, E.C.

The Voluntary Blood Donors' Association will hold its fourth annual dinner at 24, St. Swithin's Lane, London, E.C., on Saturday, November 28th, at 7.30 p.m.

The following programme for 1936–7 has been arranged by the Society of Medical Officers of Health. October 30th, 5 p.m., presidential address by Dr. Ernest Ward: "Tuberculosis." November 19th, at 11 a.m., annual Conference of the Central Council for Health Education; 4.30 p.m., reception at the London School of Hygiene and Tropical Medicine. November 20th, 11 a.m., Health Education Conference continued; 5 p.m., annual general meeting; 7.30 p.m., annual dinner at the Piccadilly Hotel. December 18th, 5 p.m., Dr. Charles Hill (Deputy Medical Secretary, British Medical Association) and Dr. Maitland Radford: "The Future of General Medical Practice." February 19th, 5 p.m., Sir Francis Fremantle: "Reform of the Medical Curriculum." March 19th, 5 p.m., Dr. Henry Herd: "Physical Education." May 21st, 5 p.m., Dr. W. G. Savage and Dr. E. H. T. Nash: "The Future of Obstetrical Practice." All the above meetings, unless otherwise indicated, will be held at 1, Thornhaugh Street, Russell Square, W.C.

A second series of three lectures on child psychology, intended for parents, teachers, nurses, and others concerned in the upbringing of young people from babyhood to adolescence will be given at Carnegie House, 117, Piccadilly, W., at 3.15 p.m. On November 2nd Dr. William Moodie will speak on "The Problems of the Ordinary Child"; on November 16th Dr. Elizabeth Sloan Chesser will discuss "The Making of a Happy Human Being"; and on November 23rd Mr. Alec Rodger will speak on "Talents and Temperaments." The fee for the full course is 12s. 6d., and for a single lecture 5s. Tickets may be obtained from the National Institute of Psychology, Aldwych House, W.C.2, or the London Child Guidance Clinic, 1, Canonbury Place, N.1.

A business meeting of the Association of Industrial Medical Officers will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., on Friday, October 30th, at 5 p.m.; and at 6 p.m. Dr. H. E. Collier will speak on "The Education of Medical Practitioners for Industry," and Dr. G. P. Crowden on "Post-graduate Training in the Practice of Preventive Medicine in Industry." On Saturday, October 31st, members of the association will pay a visit to the General Post Office, St. Martin's-le-Grand, E.C., and those intending to be present should meet in Dr. H. H. Bashford's room at 10 a.m.

The programme of the South-West London Medical Society is as follows: October 26th, Dr. Gordon Holmes, F.R.S., "Headache: Mistakes in Diagnosis"; November 11th, Mr. Blundell Bankart, "Fractures of the Neck of the Femur"; December 9th, Dr. Noel Harris, "Suggestion and Hypnosis"; January 13th, Mr. R. Hodgson Boggon, "When to Operate"; February 10th, Dr. Horace Evans, "*B. coli* Infections of the Urinary Tract"; March 10th, clinical meeting; April 14th, Mr. Claude Mullins, "Marriage, the Doctor, and the Police Court"; May 12th, Dr. Wilfred Sheldon, "Abdominal Distension in Children"; June 9th, Bolingbroke Lecture by Dr. C. E. Lakin, "Physical Signs: Are They Worth While?" Meetings are held at the Bolingbroke Hospital, Bolingbroke Grove, Wandsworth Common, S.W., at 9 p.m.

The new "Nutrition Film" will be shown at a public meeting organized by the Committee against Malnutrition in the Conway Hall, Red Lion Square, W.C., on Thursday, November 5th, at 8 p.m. The chair will be taken by Mr. Harold Macmillan, M.P., and the speakers will include Dr. T. O. Garland, Dr. Janet M. Vaughan, and Dr. Maitland Radford. Tickets at 1s. and 6d. may be had from the committee, 19c, Eagle Street, Holborn, W.C.1.

The Committee against Malnutrition has prepared a booklet entitled *Social Care of Motherhood*, with a foreword by Dame Louise McIlroy. It is written in simple language, and is published by Lawrence and Wishart, Ltd. (price 2d.).

The ninth Egyptian Medical Congress will be held at Cairo from December 14th to 18th. Further information can be obtained from the General Secretary, Kasr-el-Aini, Post Office, Cairo.

The Oxford University Press announces for publication next month a collection of essays by Dr. William Brown, entitled *Mind, Medicine, and Metaphysics: The Philosophy of a Physician.*

A special number of *Zeitschrift für Krebsforschung* (Band 44, Hefte 3 and 4) is devoted to the second International Cancer Congress held at the close of September in Brussels. It contains contributions from German institutes and clinics which are well known in this field. The publisher is Julius Springer, Berlin, and the price RM. 31.60.

The trustees of the estate of the late Mr. William Guthrie Gardiner, a Glasgow shipowner, have decided to make donations from the residue of his estate amounting to £91,000, including £5,000 each to Glasgow University, Glasgow Western Infirmary, and Stirling Royal Infirmary.

Madame Joliot-Curie, recently appointed Under-Secretary of State for Scientific Research by the French Premier, M. Blum, has resigned this post in favour of Professor Jean Perrin. In her letter of resignation to M. Blum she has put forward her candidature to the chair of the teaching of radioactivity, which will soon be vacant at the Faculty of Sciences. Her successor in the Government, Professor Perrin of the Sorbonne, is a member of the Academy of Sciences and a Nobel Prize winner.

Dr. Georges Audain, a French hospital surgeon, has undertaken to act as editor of a new fortnightly medical journal, *L'Entente Médicale*, whose publication is to begin this month. It will be devoted to practical medicine and the defence of professional interests.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

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The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh), and of the Office of the Irish Free State Medical Union (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 62550 Dublin).

QUERIES AND ANSWERS

Nocturnal Cramp

"ALPHA" writes: The query on cramp in the legs in your issue of October 3rd (p. 698) prompts me to ask those members of the profession who have the opportunity to investigate the cause, and incidentally the treatment, of this common and often distressing malady. I have to confess that my own observations have been disappointing, though not entirely without result. The investigation can hardly be carried out without a laboratory having the means of chemically testing the blood, etc. I have been troubled with nocturnal cramp ever since my schooldays, and it has increased in severity until now, in my eighty-third year, it is the plague of my life. It occurs every night, sometimes mildly, but is often very intense. I have considered all the circumstances, but have not been able to determine its cause beyond an apparent dependence on lactic acid in some way, for it has been enormously increased when I have eaten lactic acid cheese. I am an extremely moderate eater. When I am well nourished the cramp is worst. If, through illness, my diet is reduced and I become temporarily ill nourished the cramp disappears. I am certain that it depends in no way on lime salts in the system, for I have taken calcium lactate daily for thirteen years, with great benefit to general health, but with no effect, either for better or worse, on the cramp. Nitrogenous foods seem to cause less cramp than carbohydrate foods. Narcotics, such as opium, chloral, bromide, perhaps even alcohol, seem to make it worse. It is not affected by heat or cold, for it is as bad in summer with only a sheet over me as in winter with several blankets. My mother suffered severely from it; so do my brothers and sisters. The complaint seems to be very common. It is probably caused by some error of diet, which upsets the chemistry of the body. It would be worth while to investigate the cause systematically. I wonder that so little is known about this common but really dreadful complaint.

Sterilizing Needles and Syringes for Solganal Injections

Dr. J. H. BLACKBURN (Westwood Sanatorium, Queensland) writes in reply to Dr. E. Armstrong (August 22nd, p. 412): I have been administering solganal intramuscularly for the last two years and have adopted the following procedure. The syringe (Record) and needles are placed in methylated spirit overnight; early the following morning they are placed on gauze on the sterilized tray used for injections, and by the time I administer the injections the needles and syringe are quite dry. I use a 3 c.cm. syringe to facilitate matters in view of the fact that the fifth and sixth doses contain 3 c.cm. oil. If a smaller gauge syringe is used the needle has to be left *in situ* and the syringe filled with the rest of the solution. I use one separate needle for each injection, and when the injections have been administered for the day the syringe is filled with sp. vini meth. and squirted through each needle in rotation to expel the gold residue. The syringe is taken to pieces, cleansed, etc., and the needles threaded with the stylets. The needles used are of the "Empire" British-made rustless steel, with a good shoulder, which can be held tightly between the thumb and first finger of the left hand when injecting.

LETTERS, NOTES, ETC.

A Pharmaceutical Discrepancy

Dr. STUART GOLDHURST writes: I should like to draw attention to a pharmaceutical discrepancy which is bad both in practice and in principal. On ordering for a patient ac. acetylsalicyl co.—which preparation I have always considered to consist of aspirin, phenacetin, and caffeine—I was surprised to find that she had been sent a tablet containing aspirin, phenacetin, and *pulv. ipecac. co.* When I protested at the pharmacy I was shown a bottle with the label of a reputable firm, which read "acid. acetylsalicyl co., aspirin, phenacetin, pulv. ipecac." Whilst I admit that we physicians should write prescriptions in full rather than order proprietary articles, it is surely wrong and not without danger that such happenings as the above can occur. Perhaps this note may help to put them right.

Undulant Fever in Malta

The annual report on the Health of the Maltese Islands (Malta and Gozo) for 1935 includes a description of the measures taken for the prevention of undulant fever. There were 1,909 cases of the disease during the year with eighty-eight deaths, while the routine examination of goats, involving agglutination tests on 5,648 samples of blood, indicated that 805 animals were infected. The authorities are now carrying out experiments on a large scale at the new Undulant Fever Research Station with a view to securing an immunization of Maltese goats by vaccination. Another method employed to combat the disease is pasteurization. The recommendations of a special committee appointed to deal with this subject have now been sanctioned, and it is proposed to erect a milk-pasteurizing plant capable of dealing with 400 gallons of milk an hour. Improved methods of collection, examination, and distribution of milk are also envisaged. It is hoped by these means to decrease the incidence of the disease, which has been unduly prevalent during recent years.

Medical Golf

The autumn meeting of the Shropshire Medical Golf Association was held at Church Stretton on October 4th in glorious weather. The excellent scores indicate the ideal conditions for golf. In the morning an 18-holes medal competition was played for the captain's prize, presented by Dr. M. J. Harker of Oswestry. The leading scores were as follows:—Dr. H. G. W. Beckett: 82 - 13 = 69; Colonel W. H. S. Burney: 81 - 12 = 69; Dr. Harker: 76 - 6 = 70; Dr. J. Lavelle: 82 - 12 = 70; Dr. R. O. Smyth: 89 - 18 = 71. Dr. Beckett won the tie with the best score over the last nine holes. In the afternoon the Foursomes *v.* Bogey was won by Dr. Harker and Mr. B. T. Keon-Cohen = 4 down; Dr. T. R. Elliott and Dr. A. V. Mackenzie = 6 down; Dr. Lavelle and Colonel Burney = 6 down. The next meeting of the association was arranged for the second Sunday in May, 1937, at Oswestry Golf Club. Dr. Mackenzie was elected captain for 1936-7 and Dr. Elliott honorary secretary.

Corrigendum

In Dr. W. Corner's letter on "Bejel" in last week's issue an error occurred on page 785. He stated in the fourth paragraph that "*oral* mucous patches were common also in adults"—not, of course, *aural* as printed.

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 53, 54, 55, 56, 57, 58, 59, and 62 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 60 and 61.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 223.